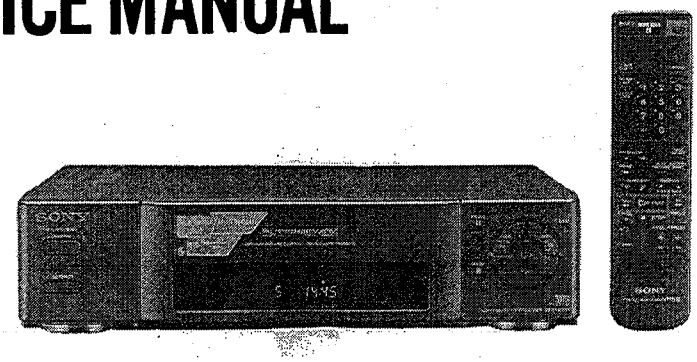
SLV-236EE/X211ME/MEJ/PS/SA/SG

RMT-V155E **RMT-V155H**

SERVICE MANUAL



E Model
SLV-X211PS

East European Model
SLV-236EE

ME Model
SLV-X211ME/X211MEJ

South Africa Model
SLV-X211SA

United Arab Emirates Model
SLV-X211SG

- **As there is no difference between the SLV-X211 Series ME/MEJ/SG, with the exception of models for PS/SA destinations, block diagrams, circuit diagrams, exploded views and electric parts only for ME are shown.**

SPECIFICATIONS

System

Channel coverage (EXCEPT X211SA)
VHF E2-E12
CATV S01-S05, S1-S20
UHF E21-E69

Channel coverage (X211SA)
VHF 4-13
UHF 2-68

RF output signal
UHF channels 32 – 41

Aerial out
75-ohm asymmetrical aerial socket

Inputs and outputs

LINE IN
VIDEO IN, Phono jack (1)
Input signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO IN, Phono jack (1)
Input level: –7.5 dBs (0 dBs = 0.775 Vrms)
Input impedance: more than 47 kilohms

LINE OUT
VIDEO OUT, Phono jack (1)
Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative
AUDIO OUT, Phono jack (1)
Rated output level: –7.5 dBs
Load impedance: 47 kilohms
Output impedance: less than 10 kilohms

General

Power requirements
110 – 240 V AC, 50/60 Hz

Power consumption
22 W

Operating temperature
5°C to 40°C

Storage temperature
– 20°C to 60°C

Dimensions
Approx. 360 × 90 × 302 mm (w/h/d)
including projecting parts and controls

Mass
Approx. 4.1 kg

Supplied accessories

Remote commander (1)
R6 (size AA) batteries (2)
Aerial cable (1)
AC power cord (1)
AC plug adaptor (1) (X211ME/MEJ/SG)

Design and specifications are subject to change without notice.

MICROFILM

VHS VIDEO CASSETTE PLAYER

SONY®

SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

1. Check the area of your repair for unsoldered or poorly-soldered connections. Check the entire board surface for solder splashes and bridges.
2. Check the interboard wiring to ensure that no wires are "pinched" or contact high-wattage resistors.
3. Look for unauthorized replacement parts, particularly transistors, that were installed during a previous repair. Point them out to the customer and recommend their replacement.
4. Look for parts which, though functioning, show obvious signs of deterioration. Point them out to the customer and recommend their replacement.
5. Check the B+ voltage to see it is at the values specified.

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK ⚠ OR DOTTED LINE WITH MARK ⚠ ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

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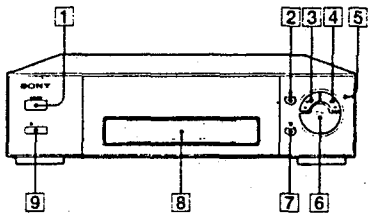
SECTION 1
GENERAL

This section is extracted from instruction manual.

Index to parts and controls

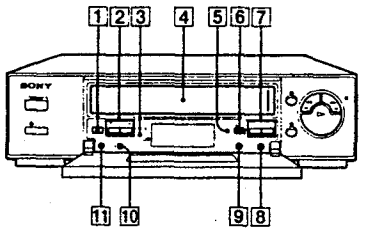
Refer to the pages indicated in ( ) for details.

Front panel



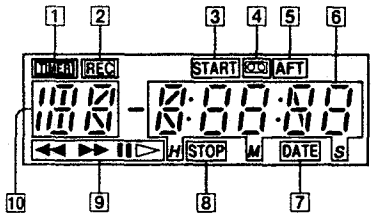
1 ON/STANDBY switch/indicator
2 ❚❚ PAUSE button
3 ◄◄ REW (rewind) button
4 ►► FF (fast-forward) button
5 OPC (optimum picture control) indicator (20)
6 ▷ PLAY button
7 ■ STOP button
8 Display window
9 ⏏ EJECT button

Concealed front panel



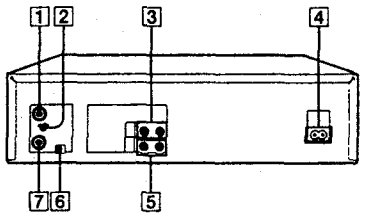
1 AUTO TRACKING button
2 ▲/▼ TRACKING/STILL ADJUST/FINE TUNING buttons
3 Remote sensor (4)
4 Cassette compartment
5 NTSC PB indicator (11)
6 ● REC (recording)/QTR (quick timer recording) button
7 PROGRAM +/– buttons
8 NEXT button (7, 8)
9 TUNER PRESET button (7, 8)
10 NTSC PB switch (11)
11 CL (clear) button (24)

Display window



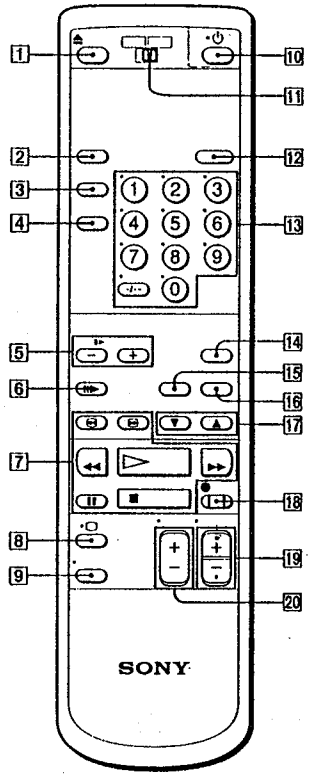
1 TIMER recording indicator (15)
2 REC (recording) indicator (12, 13)
3 Timer recording start indicator (13, 15)
4 Tape indicator (12, 15)
5 AFT (auto fine tuning) indicator (7)
6 Linear time counter/Clock indicator (9, 11)
7 DATE indicator (9, 15)
8 Timer recording stop indicator (15)
9 Tape operation indicator (10, 19)
10 Program position/AU indicator (8, 12, 15, 22)

Rear panel



1 AERIAL IN connector (5)
2 RF CHANNEL screw (6)
3 LINE IN AUDIO/VIDEO jacks (phono type) (5)
4 AC IN connector (5)
5 LINE OUT AUDIO/VIDEO jacks (phono type) (5)
6 TV SYSTEM switch (5)
7 AERIAL OUT connector (5)

Remote commander



1 ⏏ EJECT button (10)

2 TIMER CLEAR button (17)

3 TIMER SET button (15)

4 CLOCK SET button (9)

5 I► SLOW +/– buttons (19)

6 II► FRAME button (19)

7 Tape transport buttons (10, 19)
⏮/⏭ SEARCH (reverse, foward),
◄◄ REW (rewind), ▷ PLAY,
►► FF (fast-forward), ▮▮ PAUSE,
■ STOP

8 ⏻ (power on) button (only for TV)

9 TV/VIDEO button (only for TV)

10 ⏻ (on standby) button (7, 17)

11 TV/VTR switch (4)

12 EXECUTE buttton (9, 16)

13 Number buttons (8, 9, 15, 16)

14 INPUT SELECT button (12, 22)

15 AUTO TRACKING button (20)

16 COUNTER RESET button (11)

17 ▼/▲ TRACKING/STILL ADJUST buttons (20)

18 ● REC button (12, 13)

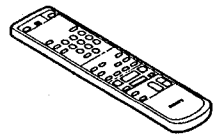
19 PROG +/– button (7, 12, 15, 17)

20 VOL +/– button (only for TV)

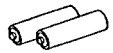
Step 1 Unpacking

Check that you have the following items:

- **Remote commander**

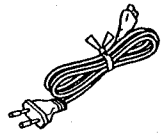


- **R6 (size AA) batteries**



- **Aerial cable**

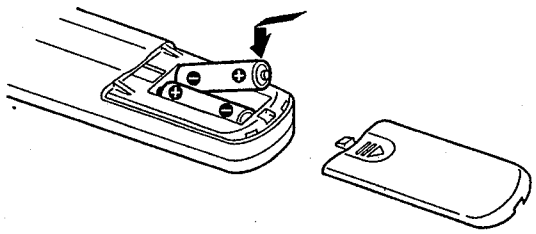
- **AC power cord**



- **AC plug adaptor**

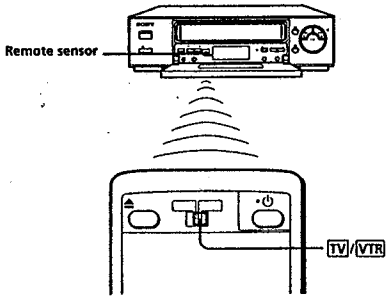
Step 2 Setting up the remote commander

Insert two R6 (size AA) batteries by matching the + and – on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your TV.

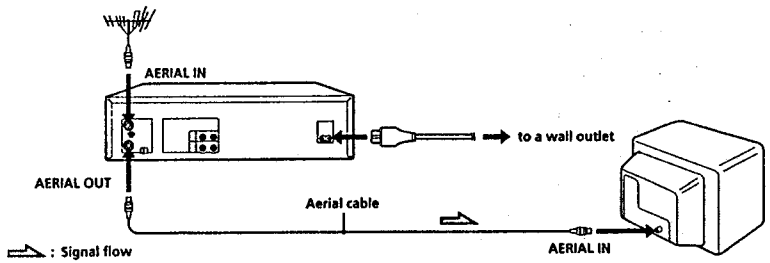


To operate	Set TV/VTR to
the VCR	VTR and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV.

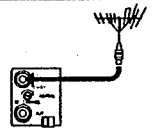
Notes

- With normal use, the batteries should last for approximately three to six months.
- If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
- Do not use a new battery with an old one.
- Do not use different types of batteries.
- For some Sony TVs, you may not be able to use the -/-- (ten's digit) button to select TV channels.

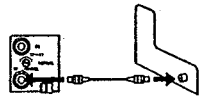
Step 3 Connecting the VCR



1 **Disconnect the aerial input cable from your TV and connect it to AERIAL IN of the VCR.**



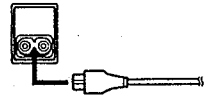
2 **Connect AERIAL OUT of the VCR and the aerial input of your TV using the supplied aerial cable.**



3 **Connect AC IN of the VCR and the AC power using the AC power cord.**

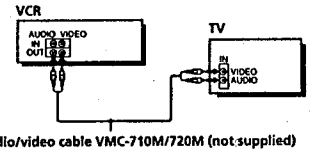
If the AC power plug does not fit in the wall outlet, use the supplied AC plug adaptor.

You've completed the basic hookup to watch and record TV programs.



Additional connections

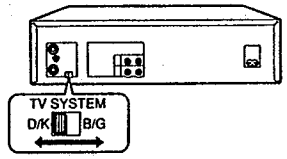
If your TV has phono type audio/video input jacks, this additional connection can improve picture quality. Connect to the TV as shown on the right.



Audio/video cable VMC-710M/720M (not supplied)

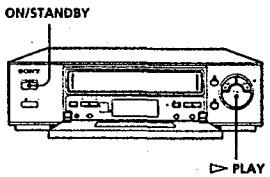
Selecting TV system

For your TV to receive the correct signal from your VCR, you must set the TV SYSTEM switch at the rear of the VCR either B/G or D/K. If this TV SYSTEM switch for the output signal is set to the wrong position, the sound is distorted.



Step 4 Tuning the TV to your VCR

If you have connected your VCR and TV using only the aerial cable, you have to adjust one of the TV program positions to receive the VCR's playback signals. For this adjustment, a recorded video tape is required.
If the TV-VCR connection is made using the audio/video cable, skip this step.



1 ON/STANDBY

Press ON/STANDBY to turn on the VCR.

2

Turn on your TV and select a program position for video playback. Choose a channel between UHF 32 and 41, where there is no picture and no sound or only a steady rustling sound. (For details, see the operating manuals for your TV.)

3

Insert a recorded tape into the cassette compartment.
The VCR turns on automatically. If the safety tab on the cassette is removed, playback also starts automatically.

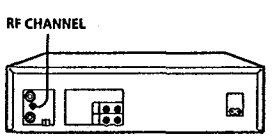
4

Press ▷ PLAY on the VCR.

5

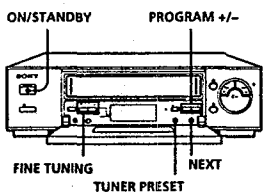
Tune the TV to the video playback picture.

To obtain a clear playback picture
The playback picture may not appear clearly in step 5 above. In this case, turn the RF CHANNEL screw at the rear of the VCR with a screwdriver, to a position where the TV clearly displays a playback picture.



Step 5 Tuning the VCR to TV channels

Now you can set your VCR to receive broadcast channels.



1 ON/STANDBY

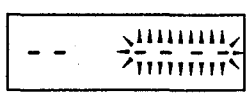
Press ON/STANDBY to turn on the VCR.

2

Turn on the TV.

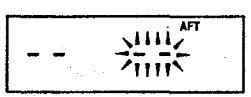
3 TUNER PRESET

Press TUNER PRESET.



4 – PROGRAM +

Press PROGRAM +/– to tune the channel you want to allocate.
AFT indicator appears if the channel is tuned correctly.



5 NEXT

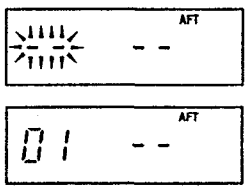
Press NEXT.
If the picture is not clear, press FINE TUNING repeatedly until you can get the best picture.

(continued)

Step 5 Tuning the VCR to TV channels (continued)

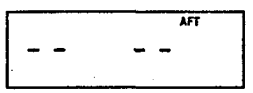
6 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ 0

Press the number buttons on the remote commander to set the desired program position.
For a single digit number, press 0 before entering the number.



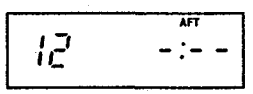
7 NEXT

Press NEXT.
The desired channel is preset to the selected program position. Repeat step 4 to 7 to allocate other channels to other program positions.



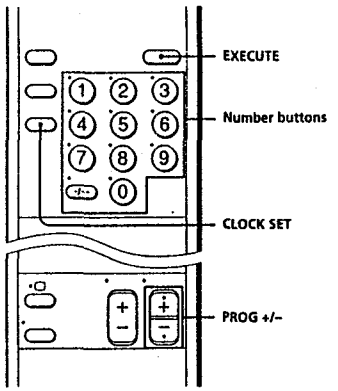
8 TUNER PRESET

Press TUNER PRESET again.
The normal display appears.



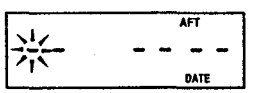
Step 6 Setting the clock

The last thing you need to do is set the date and clock.



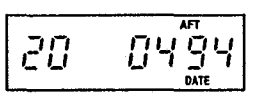
1 CLOCK SET

Press CLOCK SET.
"DATE" appears in the display window.



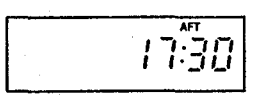
2 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ 0

Press the number buttons to set today's day, month and year.
The VCR enters the time setting mode automatically. If you have entered the wrong number, press PROG – to return to the place you want to correct. Then reenter the correct number with the number buttons.



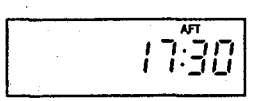
3 ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ 0

Press the number buttons to set the hour and minute.



4 EXECUTE

Press EXECUTE.
Date and time are displayed respectively for 3 seconds, then the VCR returns to the normal display.
Now the clock starts.

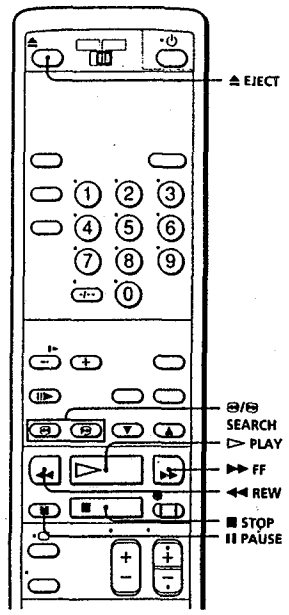


To correct the date and time

1 Press CLOCK SET.
2 Press PROG – to return to the place you want to correct.
3 Enter the correct number with the number buttons.
4 Press EXECUTE.

Basic Operations

Playing a tape



Tips

- For further information on searching and playback functions, see "Playing/ searching at various speeds" on page 19.
- You can eject a tape even when the power is off. When you press ⏏ EJECT, the VCR turns on automatically. After ejecting a tape, the VCR turns off again.

Note

- When the pause mode lasts for more than approximately five minutes, the VCR will automatically enter the playback mode.

This section shows you how to play back a video tape. You can play back a tape recorded in the SP mode only.

1 Turn on your TV and tune in to the VCR:

- If the TV is connected to the VCR using an audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the program position for the VCR.

2 Open the drop down panel and insert a tape.

The VCR turns on automatically. The tape starts playing automatically if its safety tab has been removed.

3 Press ▷ PLAY to start playing.

When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	II PAUSE
Resume play after pause	II PAUSE or ▷ PLAY
Search forward	⊖ SEARCH during playback
Search backward	⊕ SEARCH during playback
Fast-forward the tape	▶▶ FF during stop
Rewind the tape	◀◀ REW during stop
Eject the tape	⏏ EJECT

Note

- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
  - The picture becomes black and white.
  - The picture shakes.
  - No picture appears on the TV screen.
  - Black streaks appear horizontally on the TV screen.
  - The color density increases or decreases.

Notes

- When a tape is reinserted, the counter returns to "0H00M00S."
- The counter will not work on tape portions with no recording.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

To play an NTSC-recorded tape

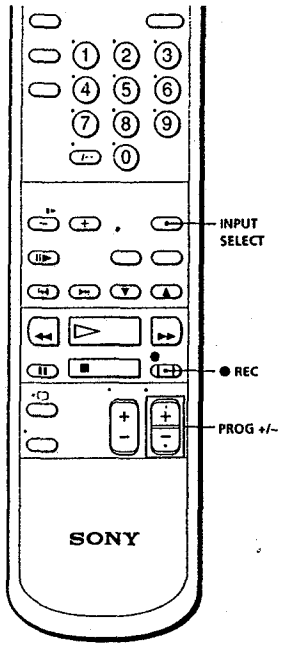
Set the NTSC PB switch on the VCR according to the color system of your TV. The NTSC PB indicator lights during playback.

When your TV is	Set NTSC PB to
PAL	ON PAL TV
NTSC 4.43	4.43

Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to"0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

Recording TV programs



Note
- If you insert a tape with its safety tab removed, the VCR starts playing. When you press ● REC, the VCR ejects a tape. To record on this tape, cover the tab hole. (See page 14.)

Tips
- To select program positions, you can also use the number buttons. For two-digit numbers, press the -/-- (ten's digit) button followed by the number buttons.
- To record from other epuipment connected to the audio/video jacks, press INPUT SELECT in step 3. "AU" appears.

This section shows you how to record TV programs in the most basic way: manual recording. With manual recording, you start the VCR recording when the program begins, then stop it when the program ends. The VCR also provides the following ways of recording:
- Manually start recording, then stop it automatically—"Recording using the quick timer" (page 13)
- Automatically start and stop recording—"Recording TV programs using the timer" (page 15)

The VCR records in the SP mode only.

1 **Turn on your TV and tune in to the VCR:**
- If the TV is connected to the VCR using the audio/video cable, set the TV to video input.
- If the TV is connected to the VCR using only the aerial cable, set the TV to the program position for the VCR.

2 **Open the drop down panel and insert a tape with its safety tab in place.**

3 **Select the desired program position by pressing PROG +/–.**

4 **Start recording by pressing ● REC.**
When the tape reaches the end, the VCR automatically rewinds it to the beginning.

To stop recording
Press ■ STOP.

Notes
- If you don't press ● REC while "STOP" flashes, "STOP" goes off, and the recording continues to the end of the tape unless you stop recording.
- When the tape reaches the end, recording stops and the VCR turns off. The tape will not be rewound to the beginning.

Maximum recording/playback time
You can record tapes only in SP mode.
See the table below for the maximum recording/playback time in SP.

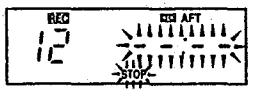
Tape type	Maximum recording/playback time
E-240	4 hrs.
E-180	3 hrs.
E-120	2 hrs.
E-60	1 hr.

Recording using the quick timer

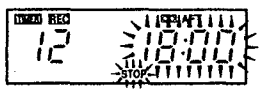
If you want to start timer recording immediatly, use the quick timer function. You can set the recording end time in units of 30 minutes, up to 24 hours.

1 **Press ● REC to start recording.**
"REC" appears in the display window.

2 **Press ● REC again.**
"STOP --:--" flashes.



3 **Press ● REC while "STOP" flashes(within 10 seconds).**
"TIMER" appears.



4 **Set the recording end time by pressing ● REC.**
Each press increases the recording time in increments of 30 minutes.

The recording stops automatically at the preset recording end time.

To check or change the end time
Press ● REC during the quick timer recording. The recording end time will appear in the display window for 10 seconds. Change the end time by pressing ● REC during this 10 second period.

To stop recording
Press ■ STOP.

Recording TV programs (continued)

Tip
- If you don't want to watch TV while recording, you can turn off the TV.

Watching a TV program while recording another

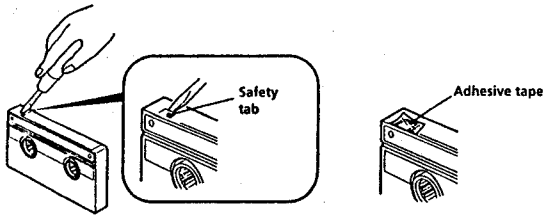
You can watch a TV program and record another at the same time.

1 If the TV is connected to the VCR using an audio/video cable, set the TV to TV input. If the TV is connected to the VCR using only the aerial cable, skip this step.
2 Select the desired program position on the TV.

Saving a recording

Video tapes have a safety tab to protect against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with its safety tab removed ejects if you try to record on it.

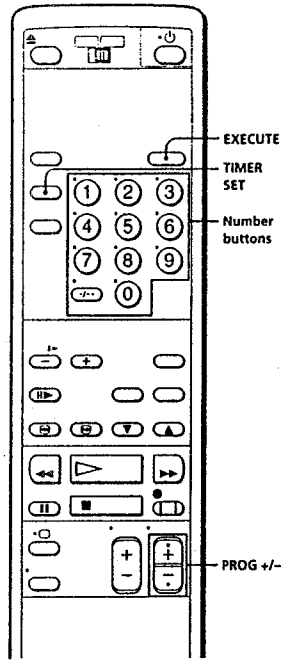
To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.



Auto head cleaner

The VCR incorporates the auto head cleaner and cleans the video heads when a tape is loaded or unloaded. When the effect is not sufficient even after a tape has been loaded/unloaded several times, use the Sony T-25CL video head cleaning cassette.

Recording TV programs using the timer

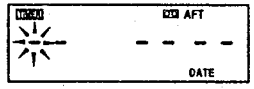


Tips
- For a single digit number, press the number button 0 before entering a single-digit setting.
- To record from other equipment connected to audio/video input jacks, press INPUT SELECT in step 2. "AU" appears.
- To change or correct the setting before excuting the settings, press PROG – to return to the item you want to change and reenter the setting.
  When you have already excuted the settings, cancel the setting and reset it again. (See page 17.)

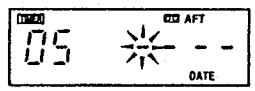
This section shows you how to let the VCR automatically start and stop recording TV programs. You can preset up to six programs up to one year in advance.

Before you start...
- Check that the clock is set correctly.
- Insert a tape with its safety tab in place. Make sure the tape is longer than the total recording time.

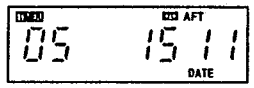
1 **Press TIMER SET.**
"TIMER" and "DATE" appears in the display window.



2 **Select the program position by pressing the number buttons.**



3 **Set the date (day and month) to start recording by pressing the number buttons.**
To record the same program every day (Monday to Friday), press PROG + to display "E" before you set the date.



4 **Set the time to start recording by pressing the number buttons.**

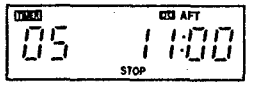
(continued)

Recording TV programs using the timer (continued)

Notes

- If you insert a tape with its safty tab removed, the VCR ejects it when you press EXECUTE. "TIMER" flashes.
- To use the VCR before the timer recording begins, press ⏻ (on/standby) to release the timer standby mode. If you use the VCR five minutes before the preset start time, "TIMER" flashes and timer recording cannot start. Press ⏻ (on/standby) to turn off the VCR.
- When the tape reaches the end during timer recording, recording stops and the VCR turns off. The tape will not be rewound to the beginning.

5 **Set the time to stop recording by pressing the number buttons.**



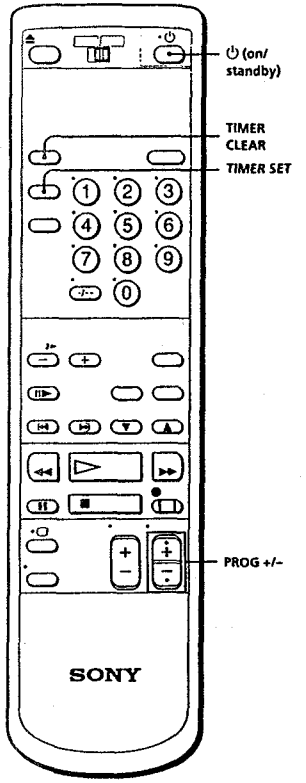
6 **Press EXECUTE.**

The VCR turns off and stands by for recording. The VCR automatically turns on and starts recording at the preset start time, and turns off at the preset stop time.

To stop recording

Press ■ STOP.

Checking/canceling timer settings



Note

- If six programs have been preset, the first preset program appears when TIMER SET is pressed once in step 2.

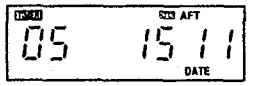
This section shows you how to check and cancel the timer settings after you've stored them in the VCR.

1 **Press ⏻ (on/standby) to turn on the VCR.**

2 **Press TIMER SET twice to enter the check mode.**

3 **Check the timer settings:**

Each time you press TIMER SET, the preset programs (their dates and the program positions) appear successively.



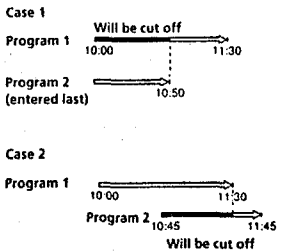
Each time you press PROG +/–, the selected program's start time, stop time and date appear in turn.

- If you want to release the check mode, press TIMER SET after displaying the last preset program. The VCR returns to stand by for recording.

4 **Cancel or change the timer setting:**

- To cancel the setting, press TIMER CLEAR while displaying the program you want to cancel. The VCR returns to normal display. If there are any other timer settings left, the VCR returns to the recording standby mode.
- To change the setting, cancel the program you want to change, and reset the timer settings again. (See page 15.)

Checking/canceling timer settings (continued)



When the timer settings overlap

The VCR will not record overlapping programs. If any of your timer settings overlap, change the settings.

Case 1: If you preset two programs to start recording at the same time...

The program entered last has priority over the other programs.

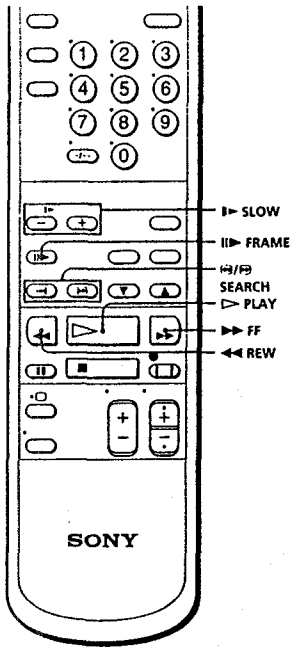
Case 2: If you preset program 2 to start recording before program 1 is finished recording...

Program 2 will not start recording until program 1 has finished.

Additional Operations

Playing/searching at various speeds

You can play back a tape at various speeds: high-speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback. The sound is muted during these operations.



Playback options	Operation	To resume normal playback
Playing at high speed	During playback, keep pressing ▶▶ FF or ◀◀ REW.	Release the button.
Fast-forwarding/ Rewinding	During stop, press ▶▶ FF or ◀◀ REW.	Press ▷ PLAY.
Viewing the picture during fast-forward or rewind	During fast-forward, keep pressing ▶▶ FF. During rewind, keep pressing ◀◀ REW.	To return to the previous mode, release the button.
Locking in a high-speed picture	During playback or pause, press ⊖ SEARCH or ⊕ SEARCH.	Press ▷ PLAY.
Locking in a slow-motion picture	During playback or pause, press I▶ SLOW+/–. You can increase the playback speed with the + button and decrease the speed with the – button.	Press ▷ PLAY.
Playing frame by frame	During pause, press II▶ FRAME to advance the picture one frame. Keep pressing the button to advance one frame every one second.	Press ▷ PLAY.

Tip

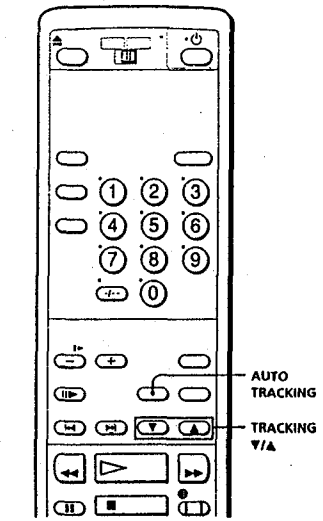
- If the picture is shaking while in the still mode, adjust the picture with the ▼/▲ STILL ADJUST buttons.

Note

- Streaks or snow cannot be eliminated completely in the various playback operations.

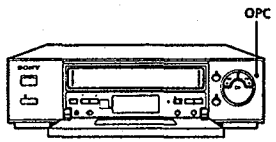
Adjusting the picture

The VCR automatically adjusts the picture for the best possible playback. If, however, streaks or snow appear on the screen, you can adjust the picture either automatically or manually.



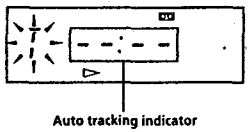
Notes

- The auto tracking function works automatically when you play back a tape just after inserting it.
- Sufficient picture quality may not be obtained when playing back tapes recorded on another VCR, or in poorly condition.
- When a recorded tape with the copyguard system is played back, the intermittent distortion may appear in the upper portion of the picture. However, this is not a malfunction of the unit.



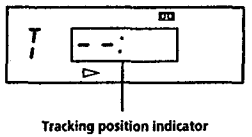
Automatic tracking adjustment

Press AUTO TRACKING during playback. The VCR automatically adjust the tracking.
The AUTO TRACKING indicator appears and "T" flashes in the display window while adjusting the picture.



Manual tracking adjustment

Though the VCR automatically adjusts the tracking when playing a tape, distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking condition.
Press TRACKING ▼/▲ to display the tracking position indicator. The distortion should disappear as you press one of the two buttons.



About Optimum Picture Control (OPC)

Optimum Picture Control (OPC) automatically improves playback quality by adjusting the VCR to the condition of the video heads and tape. The OPC indicator lights during playback.
The OPC function automatically works on all types of tapes, including rental tapes.

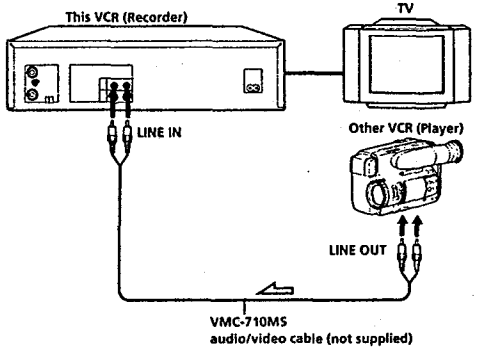
Editing with another VCR

This section shows you how to edit to or from another VCR or camcorder. You can make a copy of a tape using this VCR for recording or playback.

Tip

- Make sure you connect the plugs to jacks of the same color.

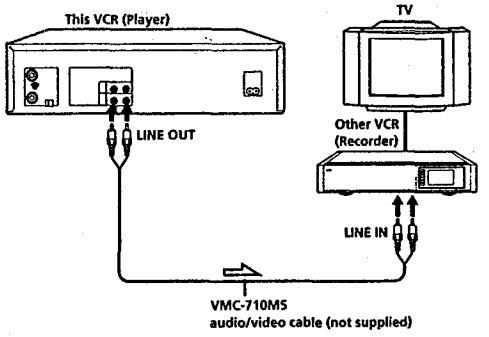
How to hook up to record on this VCR



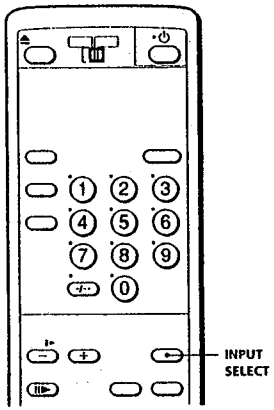
Tip

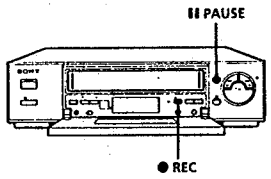
- If a VCR has the AUDIO L and R jacks, use a commercially available connecting cable like a Sony VMC-910MS.

How to hook up to record to another VCR



Editing with another VCR (continued)





Tips

- To release the VCRs from pause, use the II PAUSE buttons on the VCRs so that you can edit more precisely.
- To cut out unwanted scenes while editing, press II PAUSE on this VCR when an unwanted scene begins. When it ends, press II PAUSE again to resume recording.

Operation (when recording on this VCR)

Before you start editing

- Press INPUT SELECT on the remote commander to display "AU" in the display window.

1 **Insert a source tape with its safety tab removed into the other (playback) VCR. Search for the point to start playback and set it to playback pause.**

2 **Insert a tape into this (recording) VCR. Search for the point to start recording and press II PAUSE.**

3 **Press ● REC on this VCR to set it to recording pause.**

4 **To start editing, press the II PAUSE buttons on both VCRs to release the VCRs from pause.**
For best results, press the pause button on the other VCR just before pressing II PAUSE on this VCR.

To stop editing
Press the ■ STOP buttons on both VCRs.

SECTION 2
DISASSEMBLY

1-1. REMOVAL OF CABINET, MECHANISM UNIT AND MAIN BOARD

REMOVING THE CABINET PARTS (Fig. 1.1.1)

1. Remove the cabinet and bottom cover by removing the four screws (A) and five screws (B).
2. Remove the front panel by removing the locks of the clamps (C) using a screwdriver, etc., and slightly rotating the bottom part in the direction of the arrow.

Note: Electrical adjustments for the this model can be performed with only the cabinet removed.

REMOVING THE MECHANISM MAIN UNIT (Fig. 1.1.2)

After removing the cabinet parts:

1. Remove the two screws (D), and then remove the bracket.
2. Remove the 22-wire flat cable from the MC-2 PWB, and then remove the 11-wire flat cable from the VP-1 PWB Assembly.
3. Remove the mechanism main unit by removing the two screws (E) and two screws (F).
   Remove, as well, the two screws (G) at the cassette tray side while pressing the tray lock lever as shown in the enlarged view and pushing the cassette tray to the position where the two screw (G) appear.

REMOVING THE CP-1 PWB ASSEMBLY (Fig. 1.1.3)

After removing the cabinet parts and mechanism unit:

1. Pull out the TM-1 PWB and TM-2 PWB from the chassis while pressing and spreading out the six clamps (H) and three clamps (I) as shown by the arrows.
2. Remove the two red screws (J). Next, remove the CP-1 PWB Assembly by lifting it straight up while pressing and spreading out the two clamps (K) as ahown by the arrows.

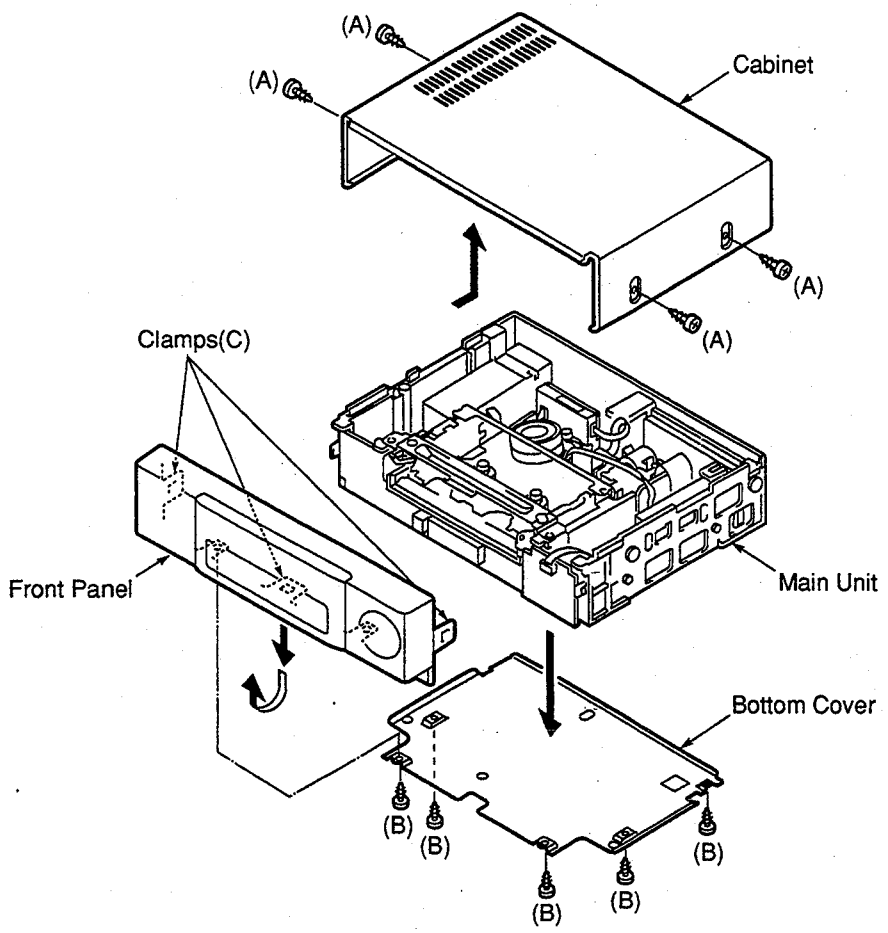


Fig. 1.1.1

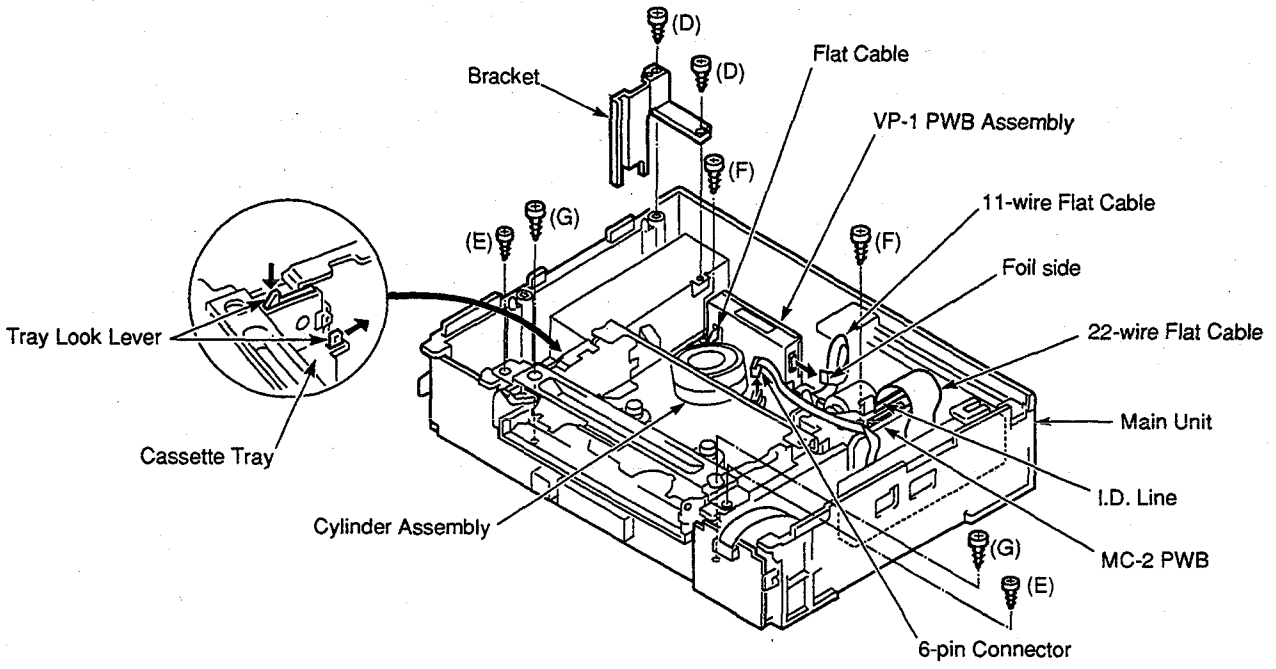


Fig. 1.1.2

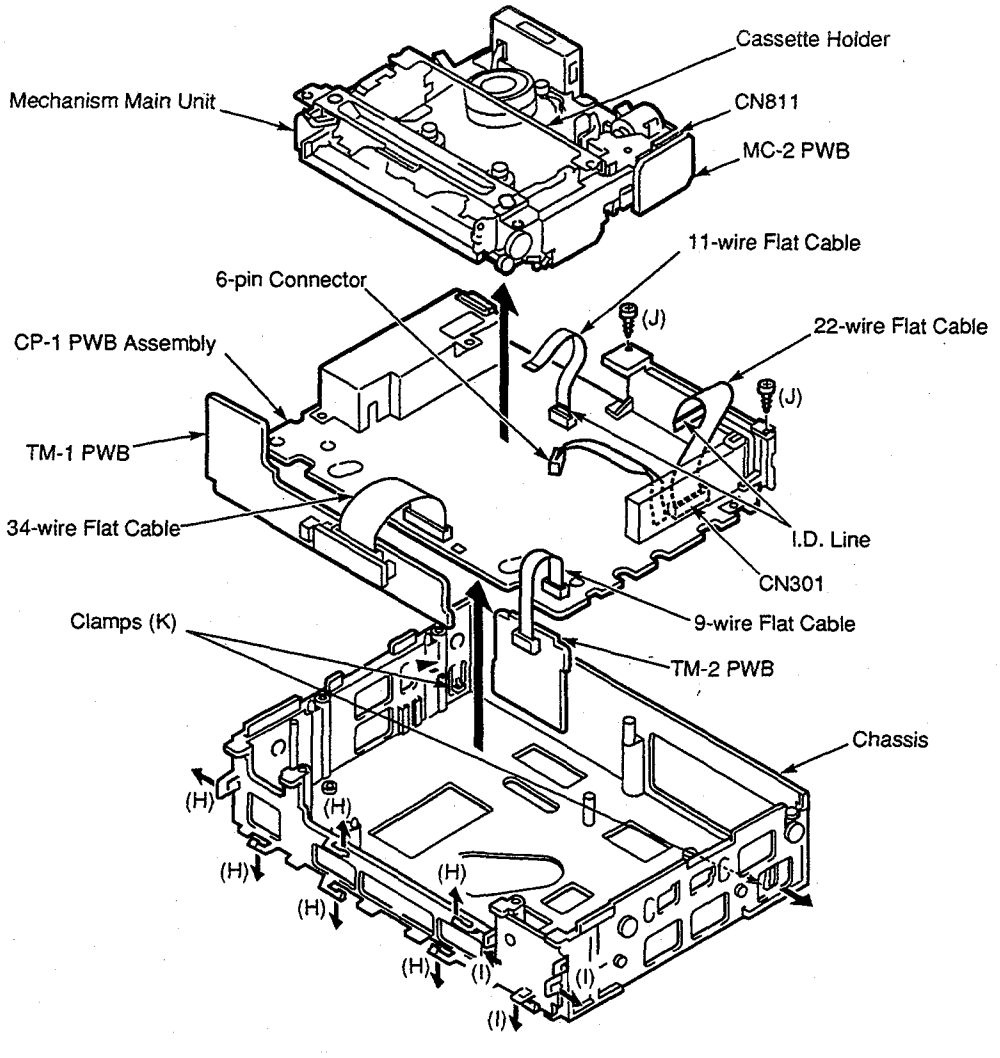


Fig. 1.1.3

TEMPORARILY SETTING UP AND CONNECTING MAIN PWB ASSEMBLY

The following is an example of how to place and connect the main PWB not requiring a jig, when repairing the CP-1 PWB assembly (Fig. 1.1.4)

1. Place the mechanism main unit at the fixed position on the chassis.
2. Connect the 22-wire flat cable to the MC-2 PWB and the 6-pin connector to the ACE head, and the 11-wire flat cable to the VP-1 PWB Assembly respectively.
3. Place the CP-1 PWB Assembly above the mechanism main unit along the cassette holder. Insert the tip (L) of the terminal board into the opening (M) at the side of the chassis, as shown in the enlarge view.

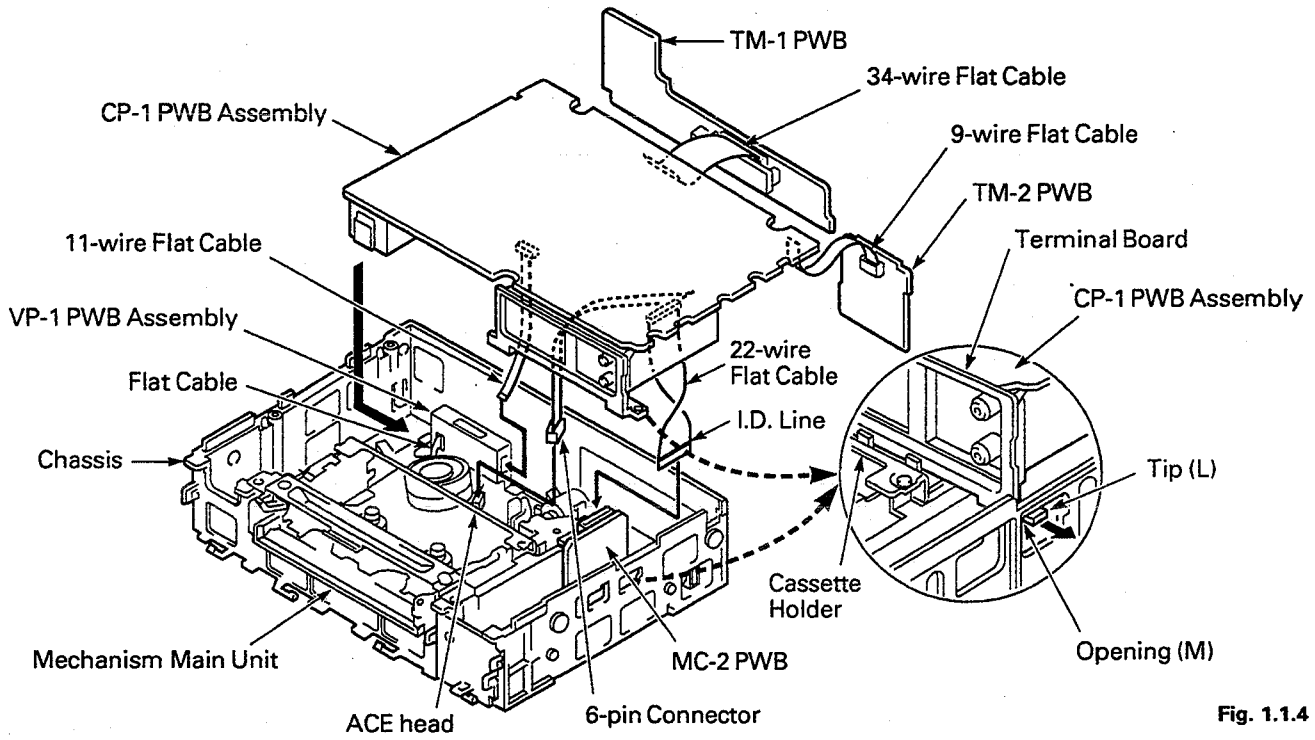


Fig. 1.1.4

SECTION 3
DIAGRAMS

CIRCUIT BOARDS LOCATION

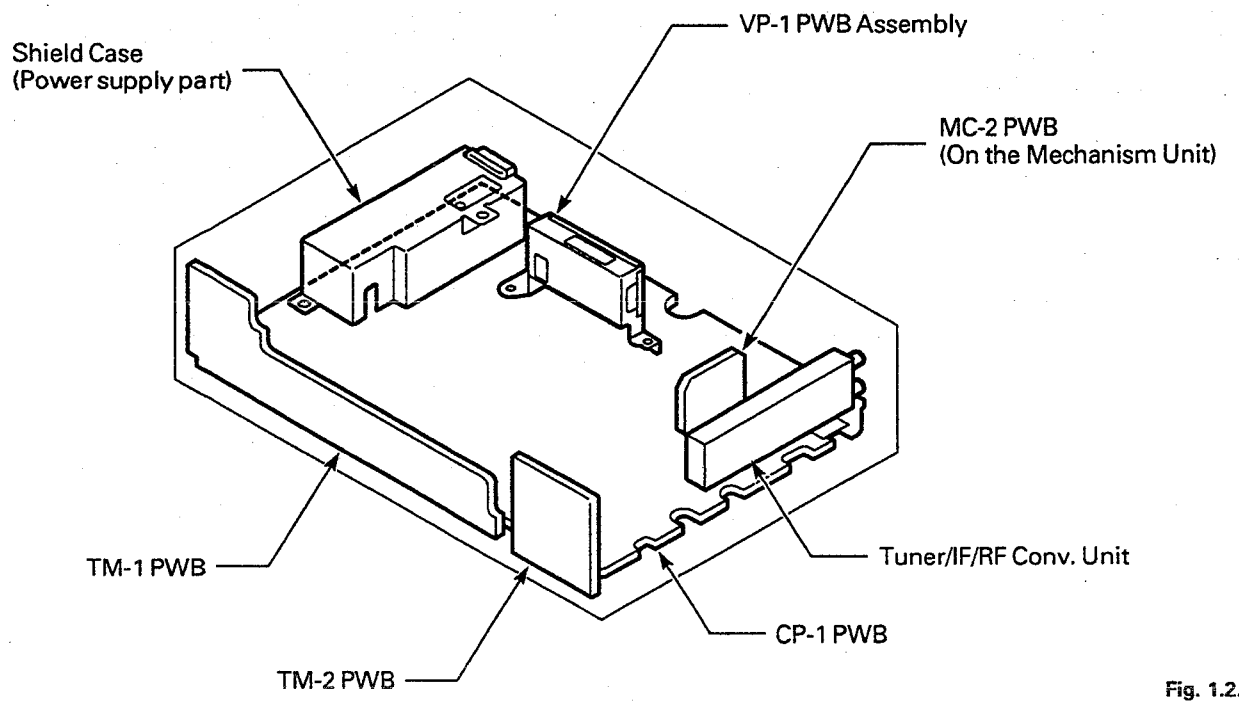


Fig. 1.2.1

NOTES:
1. All resistance values in "OHMS" unless otherwise noted. (K=1,000 M=1,000,000)
2. All capacitance values in "μfd" unless otherwise noted. p=pico farad
3. All inductance values in "mH" unless otherwise noted. μ=micro henry

PRODUCT SAFETY NOTICE

THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SYMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST. DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

OVERALL WIRING DIAGRAM

F/E HEAD — CN842 BR: F/E HEAD, GND

MC-5 R/P HEAD — CN: F/E HEAD, GND; CN841: CTL −, CTL +, R/P HEAD (P), R/P HEAD (R), FE. AE, GND

CN831 MC-4 SENSOR LED — T S LED(A), T S LED(K)

MC-1 SENSOR — CN801 BR: GND, SAFETY SW, SWD 5V, T. REEL P

MC CAPSTAN MOTOR — CN 01 BR: MC-F/R, CAP-VS, GND, C-FG, SWD 5V, ALWAYS 13V MC, GND (MC)

MH HEAD DRUM MOTOR — CN 01 WH: D-PG, GND, D-FG, ALWAYS 13V MH, DRUM-VS, GND (MH)

MC-3 MECHANISM CONNECTION — CN823: GND, SW DATA 1, SW DATA 0, SW DATA 2, LO. MOTER +, LO. MOTER −

ME. MP SW

M.L

VP-1
LO. NO. 1801-

VIDEO PRE-AMP

CN182 FFC: NC, CH2, COM, CH1, GND — TO MECHANISM

CN181 FFC: NC, RF SW P, C. SYNC, REC H, ENV. DET, GND, R/P. C/PB. FM, SWD 5V, REC-BIAS, REC-Y, GND

CN101 FFC: NC, RF SW P, C. SYNC, REC H, ENV. DET, GND, R/P. C/PB. FM, SWD 5V, REC-BIAS, REC-Y, GND

CN201 (P): CTL −, CTL +, R/P HEAD (P), R/P HEAD (R), FE. AE, GND

CP-1
VD-A LO. NO. 1001-
AD-A LO. NO. 2001-
SY-A LO. NO. 3001-
SV-A LO. NO. 3501-
PW-A LO. NO. 5001-
TN-A LO. NO. 6001-
(TM-A LO. NO. 7501-)

MECHANISM CONNECTION MC-2

CN816 (P): GND, SAFETY SW, SWD 5V, T. REEL P

CN817 WH: T. TOP S, GND, T. END S, GND, FL START SW, GND — TO MECHANISM

CN815 (P): MC-F/R, CAP-VS, GND, C-FG, SWD 5V, ALWAYS 13V MC, GND (MC)

CN814 (P): D-PG, GND, D-FG, ALWAYS 13V MH, DRUM-VS, GND (MH)

CN813: GND, SW DATA 1, SW DATA 0, SW DATA 2, LO. MOTER +, LO. MOTER −

CN811 FFC: T. TOP S, T. END S, FL. START SW, T. REEL P, SAFETY SW, GND, MC-F/R, CAP-VS, C-FG, SWD 5V, LO. MOTOR +, ALWAYS 13V MC, LO. MOTOR −, GND(MC), D-PG, D-FG, DRUM-VS, ALWAYS 13V MH, SW DATA 2, GND(MH), SW DATA 0, SW DATA 1

CN301 FFC: T. TOP S, T. END S, FL. START SW, T. REEL P, SAFETY SW, GND, MC-F/R, CAP-VS, C-FG, SWD 5V, LO. MOTOR +, ALWAYS 13V MC, LO. MOTOR −, GND(MC), D-PG, D-FG, DRUM-VS, ALWAYS 13V MH, SW DATA 2, GND(MH), SW DATA 0, SW DATA 1

ANT

RF: BST5(ALWAYS 5V), TANK SW, TP-SG 5V, VIDEO IN, AUDIO IN, IFT SW, MBS(SWD 5V)

TU: TU, LB, OPEN, OPEN, BH12, AFT IN, UB, HB, OPEN, OPEN

IF: OPEN, IF SW, AUDIO OUT, GND, AFT OUT, N.C., OPEN, N.C., VIDEO OUT

NOTE

	¥1, ¥2	¥3	¥4
SLV-X211ME	NTSC PB LED	NC	NC
SLV-X211SA	NTSC PB LED	IFT SW	IF SW
SLV-X211PS	NTSC PB LED	NC	NC
SLV-236EE	NC	NC	NC

CN303 FFC: SEG i, SEG h, NC, NC, KEY 2, KEY 1, KEY 0, ALWAYS 5V, OPC

CN721 FFC: SEG i, SEG h, NC, NC, KEY 2, KEY 1, KEY 0, ALWAYS 5V, OPC — SWITCH TM-2 LO. NO. 7201-

CN302 FFC: ¥1 NTSC PB LED, GND, HERTER −, HEATER +, BACK UP GND, KEY 0, KEY 1, KEY 2, KEY 3, CLK ADJ, GRID 8, GRID 7, GRID 6, GRID 5, GRID 4, GRID 3, GRID 2, GRID 1, SEG l, SEG k, SEG j, SEG i, SEG h, SEG g, SEG f, SEG e, SEG d, SEG c, SEG b, SEG a, SWD 5V, ALL CLEAR, ALWAYS 5V, REMOCON

CN701 FFC: NTSC PB LED ¥2, GND, HEATER −, HEATER +, BACK UP GND, KEY 0, KEY 1, KEY 2, KEY 3, CLK ADJ, GRID 8, GRID 7, GRID 6, GRID 5, GRID 4, GRID 3, GRID 2, GRID 1, SEG l, SEG k, SEG j, SEG i, SEG h, SEG g, SEG f, SEG e, SEG d, SEG c, SEG b, SEG a, SWD 5V, ALL CLEAR, ALWAYS 5V, REMOCON — DISPLAY (FLD) & SWITCH TM-1 LO. NO. 7101-

MECHANISM MODE DETECT SWITCH

M.L

T.S — D8301 — MC-4

CN831 CN801: T.S.LED(A), T.S.LED(K)

LINE AD INPUT (JK201 RCA IN)

TUNER AD INPUT (TO TN-A)

MECHANISM BLOCK

AUDIO R/P HEAD

(P) (R)

R2001

(+) BIAS (−) TP201 TP202

R2018 CURRENT BIAS

T2001 Q2001 70kHz OSC

AUDIO E HEAD

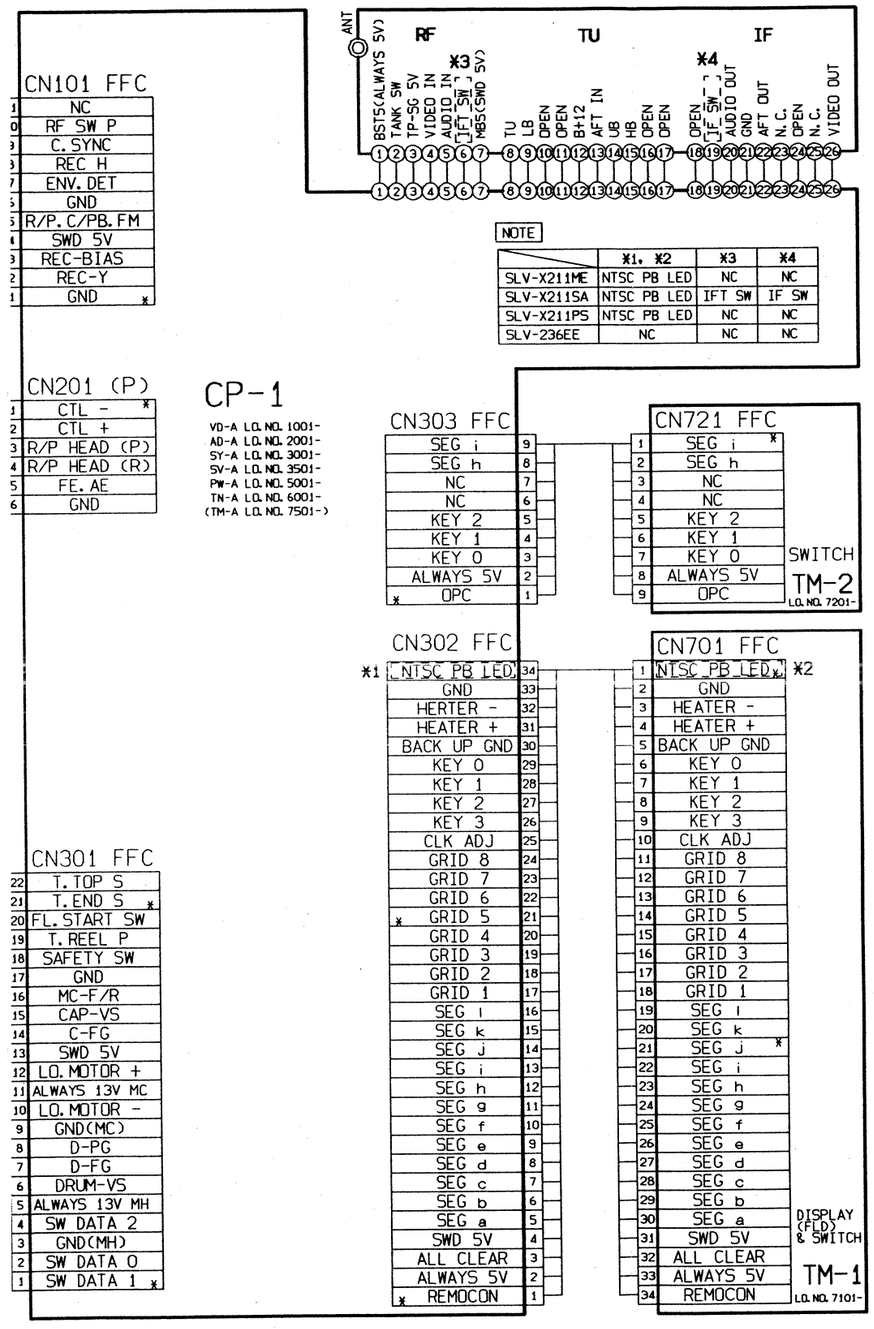
FULL E HEAD

REC EE PB EE SP, LP EP PE

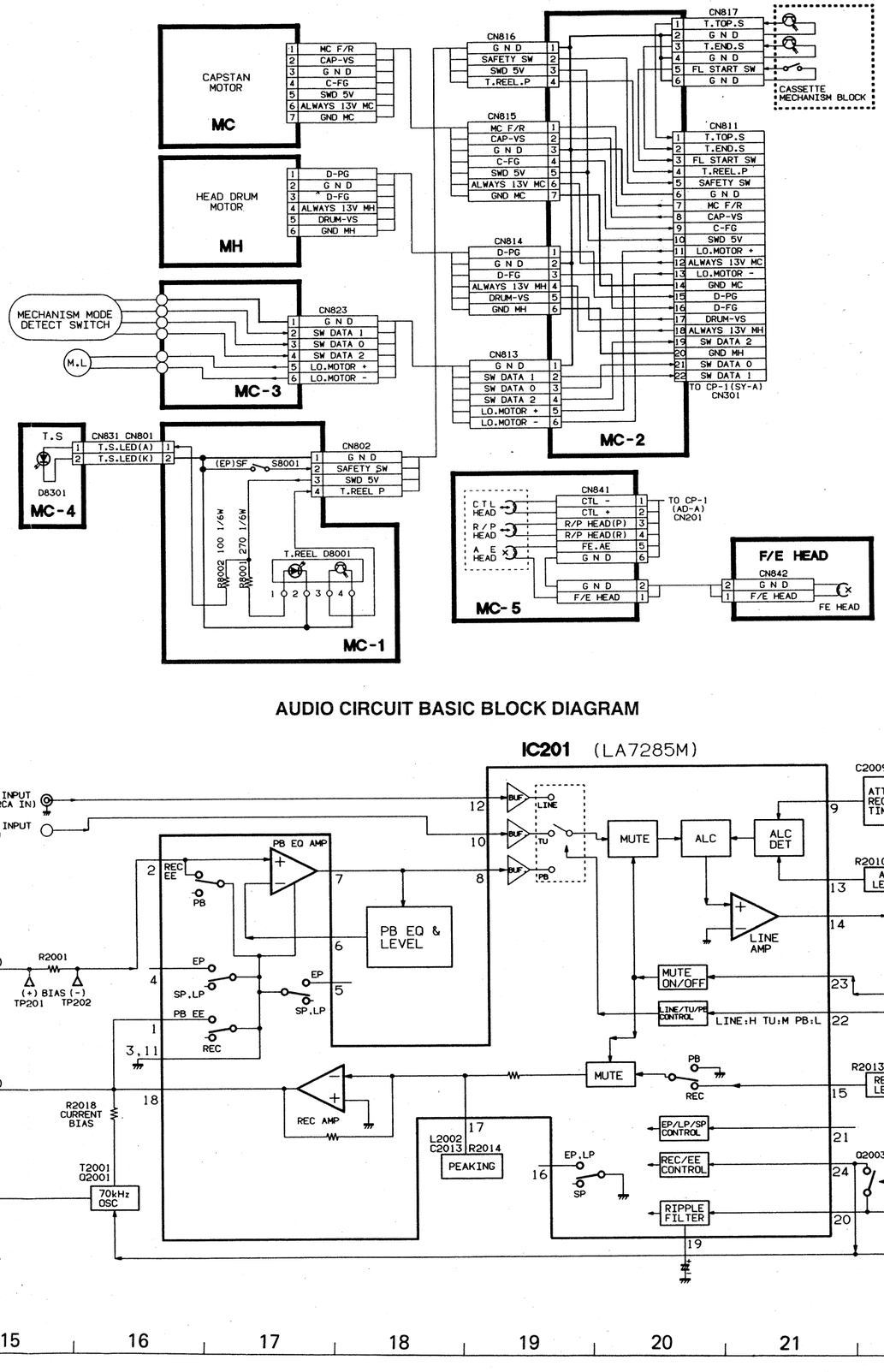
2 4 1 3, 11 18

- Information for SLV-X211ME also includes information for SLV-X211MEJ/SG.

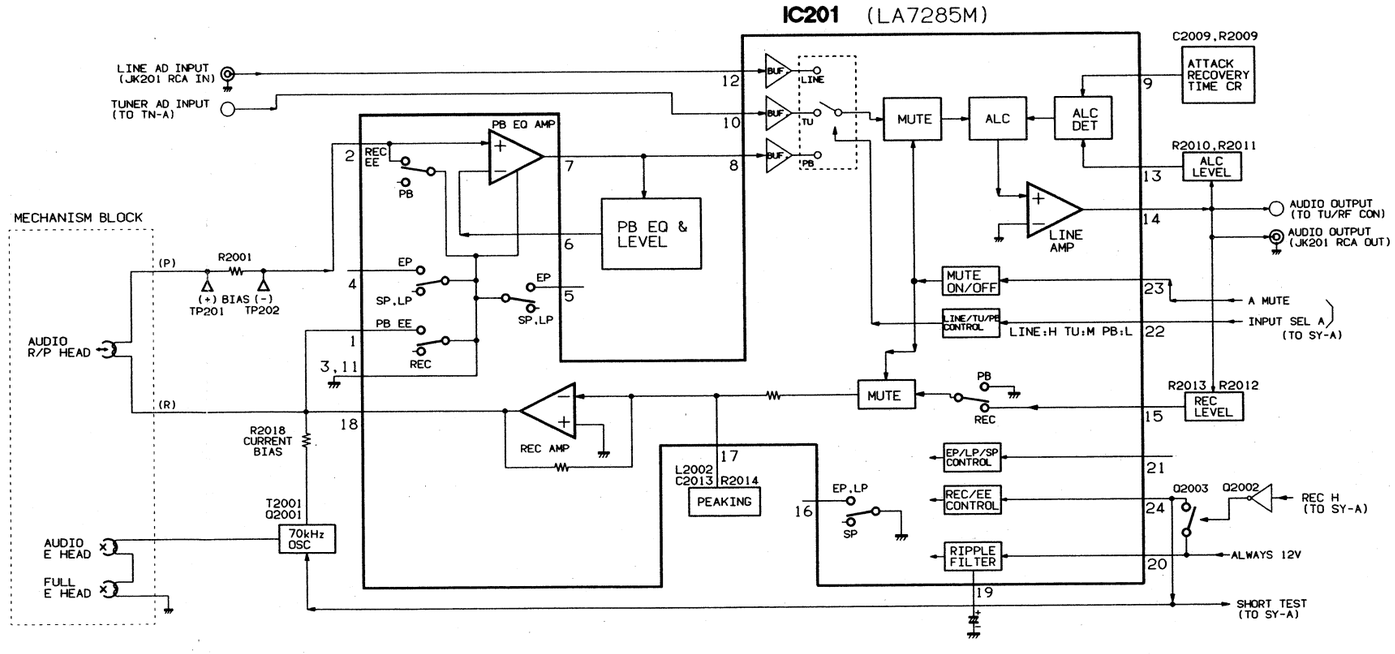
AGRAM



MECHANSM CONNECTION CIRCUIT DIAGRAM



AUDIO CIRCUIT BASIC BLOCK DIAGRAM



7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

VIDEO BASIC BLOCK DIAGRAM

PRE AMP UNIT.
IC181(LA7410) REC/PRE.AMP

HEAD DRUM
R.T
CH1
V-HEAD
CH2
R.T
17
18
21
20
AMP
AMP
SW
REC:ON
PB:OFF
VCC
L
H
RF SW P
ENV DET
5 ENV. DET. TO IC301
PB
REC
REC/PB C
PB FM
REC Y
AMP
AMP
AGC
7
RF. ENVELOPE
TP182
ENV.
14
CURRENT AMP
REC:OFF
PB:ON
RF SWITCHING PULSE
2
RF SW P
TP183
RF SW P
AGC DET
REC-BIAS
Q1004
SW
10
Q1005
SW
Q1006
SW
ORC DATA 0
PKG CTL
ORC DATA 1
RF CTL
ORC DATA 2
VD MUTE
TP181
REC CURRENT CHECK
14
13
PB C
REC C

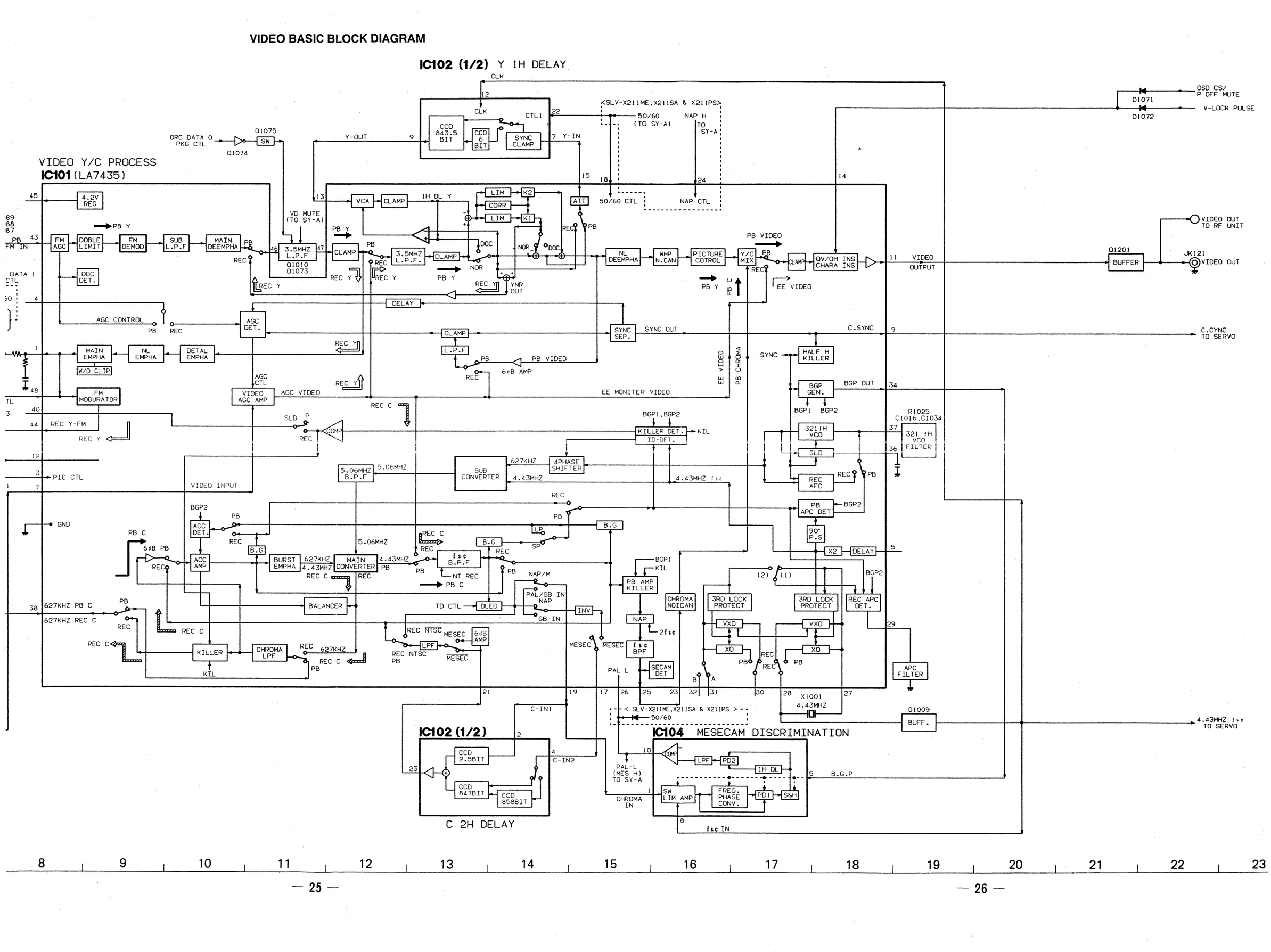
VIDEO Y/C PROCESS
IC101 (LA7435)

PB Y
Q1087-Q1089
L1086-L1088
C1085-C1087
FILTER
PB
FM IN
43
Q1078
SW
ORC DATA 1
RF CTL
Q1079
SW
50/60
SLV-X211ME
SLV-X211SA
SLV-X211PS
PB H
ALWAYS 5V
Q1013
1
48
R/P CTL
TP103
40
FILTER
8
REC Y
RF SW P
12
3
PIC CTL
Q1071
7
GND
38
627KHZ PB C
627KHZ REC C
PB
REC
REC C
45
4.2V REG
FM AGC
DOBLE LIMIT
FM DEMOD
SUB L.P.F
MAIN DEEMPHA
PB
REC
46
3.5MHZ L.P.F
Q1010
Q1073
47
4
AGC CONTROL
DOC DET.
MAIN EMPHA
W/D CLIP
NL EMPHA
DETAL EMPHA
FM MODURATOR
44
REC Y-FM
REC Y
AGC DET.
AGC CTL
VIDEO AGC AMP
AGC VIDEO
REC Y
REC C
SLD
P
REC
COMP
VIDEO INPUT
ACC DET.
PB
REC
B.G
ACC AMP
BURST EMPHA
627KHZ
4.43MHZ
REC C
MAIN CONVERTER
4.43MHZ
PB
REC
5.06MHZ
5.06MHZ B.P.F
SUB CONVERTER
627KHZ
4.43MHZ
4PHASE SHIFTER
4.43MHZ fsc
BALANCER
KILLER
CHROMA LPF
REC
627KHZ
REC C
PB
KIL
6dB PB
REC
REC C
PB C
REC C
REC
PB
fsc B.P.F
NT REC
PB C
REC C
B.G
LP
SP
REC
PB
B.G
BGP1
KIL
PB AMP KILLER
NAP
2fsc
VXO
XO
3RD LOCK PROTECT
CHROMA NOICAN
(2)
NAP/M
PAL/GB IN NAP
GB IN
INV
TD CTL
DLEO
REC NTSC
MESEC
LPF
6dB AMP
REC NTSC
PB
MESEC
MESEC
fsc BPF
SECAM DET
PAL L
B
A
21
19
17
26
25
23
32
31
30
< SLV-X211ME,X211SA & X211PS >
50/60
PAL-L (MES H) TO SY-A
CHROMA IN
BGP1,BGP2
KILLER DET.
ID-DET.
KIL
10
COMP
LPF
PD2
1
SW LIM AMP
FREQ. PHASE CONV.
PD1
8
fsc IN
C-IN1
C-IN2
2
4
23
CCD 2.5BIT
CCD 847BIT
CCD 858BIT
C 2H DELAY
IC102 (1/2)

IC102 (1/2) Y 1H DELAY

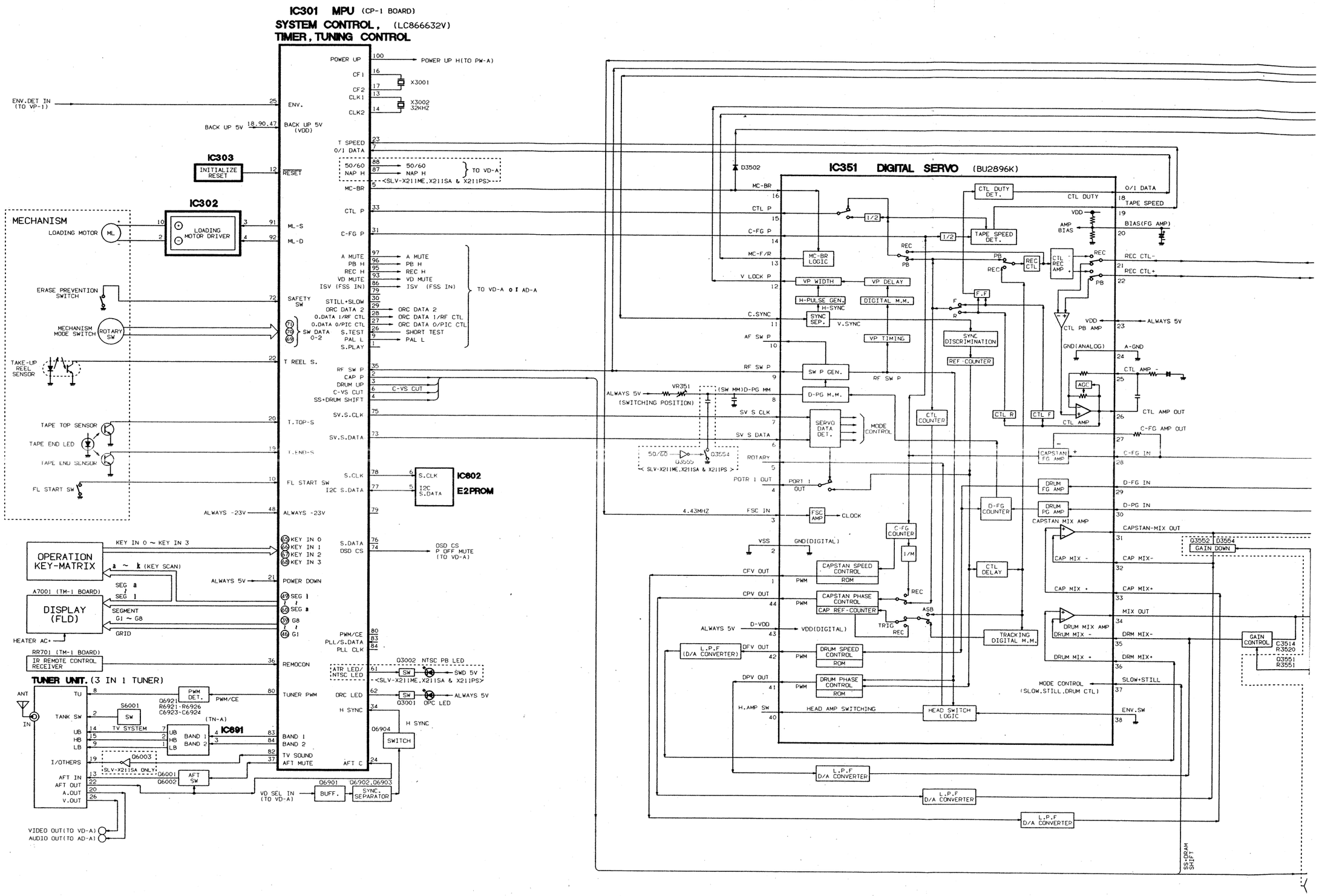
CLK
12
CLK
CTL1
22
CCD 843.5 BIT
CCD 6 BIT
SYNC CLAMP
7 Y-IN
<SLV-X211ME,X211SA & X211PS>
50/60 (TO SY-A)
NAP H TO SY-A
18
24
50/60 CTL
NAP CTL
ORC DATA 0
PKG CTL
Q1075
SW
Q1074
Y-OUT
9
VD MUTE (TO SY-A)
13
VCA
CLAMP
1H DL Y
LIM
K2
CORR
LIM
K1
ATT
15
PB Y
CLAMP
PB
REC
REC Y
3.5MHZ L.P.F.
CLAMP
NOR
DOC
DOC
REC
PB
PB Y
REC Y
YNR OUT
NL DEEMPHA
WHP N.CAN
PICTURE CONTROL
Y/C MIX
PB
REC
PB VIDE
PB Y
PB C
DELAY
CLAMP
L.P.F
PB
REC
64B AMP
PB VIDEO
SYNC SEP.
SYNC OUT
EE VIDEO
PB CHROMA
SYNC
EE MONITER VIDEO
REC C
REC Y
REC Y
REC Y

VIDEO BASIC BLOCK DIAGRAM

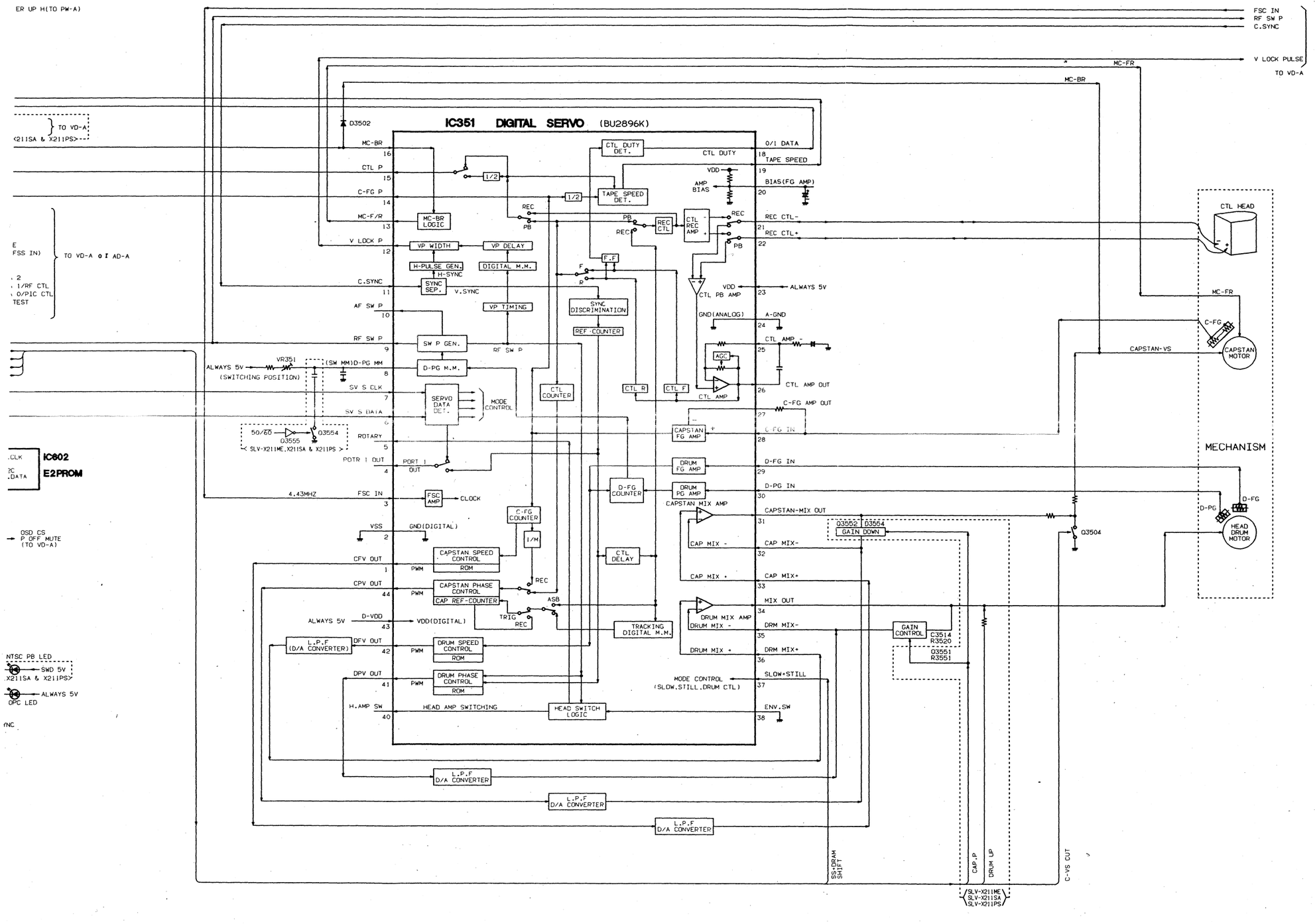


8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM



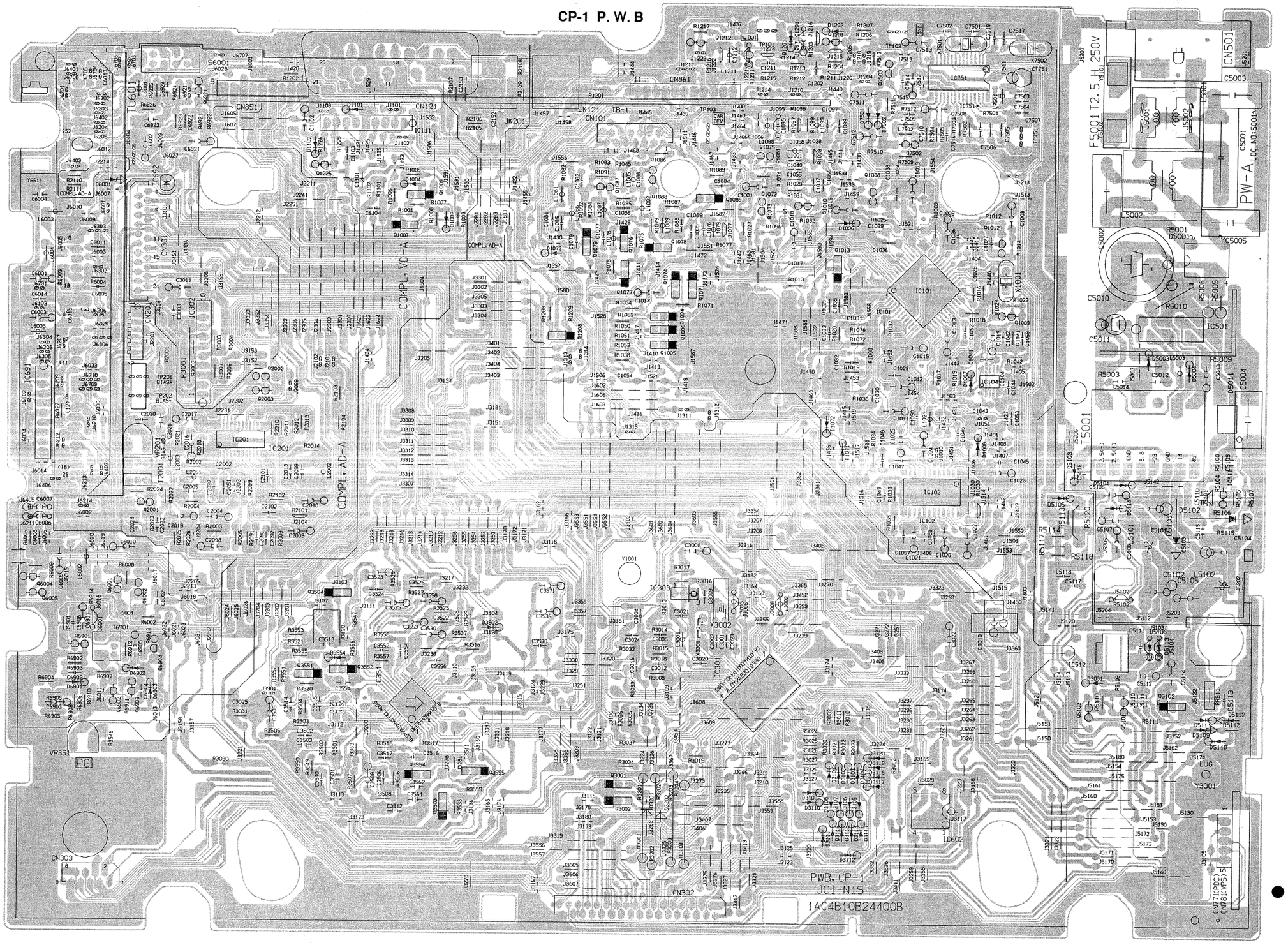
SYSTEM CONTROL & SERVO CIRCUIT BASIC BLOCK DIAGRAM



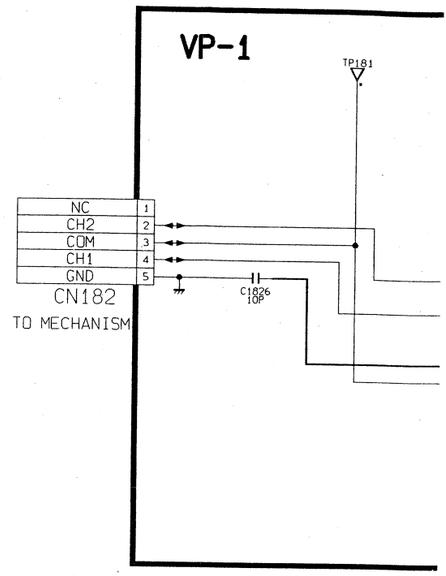
SECTION 4
SCHEMATIC DIAGRAMS AND PRINTED WIRING BOARDS

● Information for SLV-X211ME also includes information for SLV-X211MEJ/SG.

CP-1 P. W. B



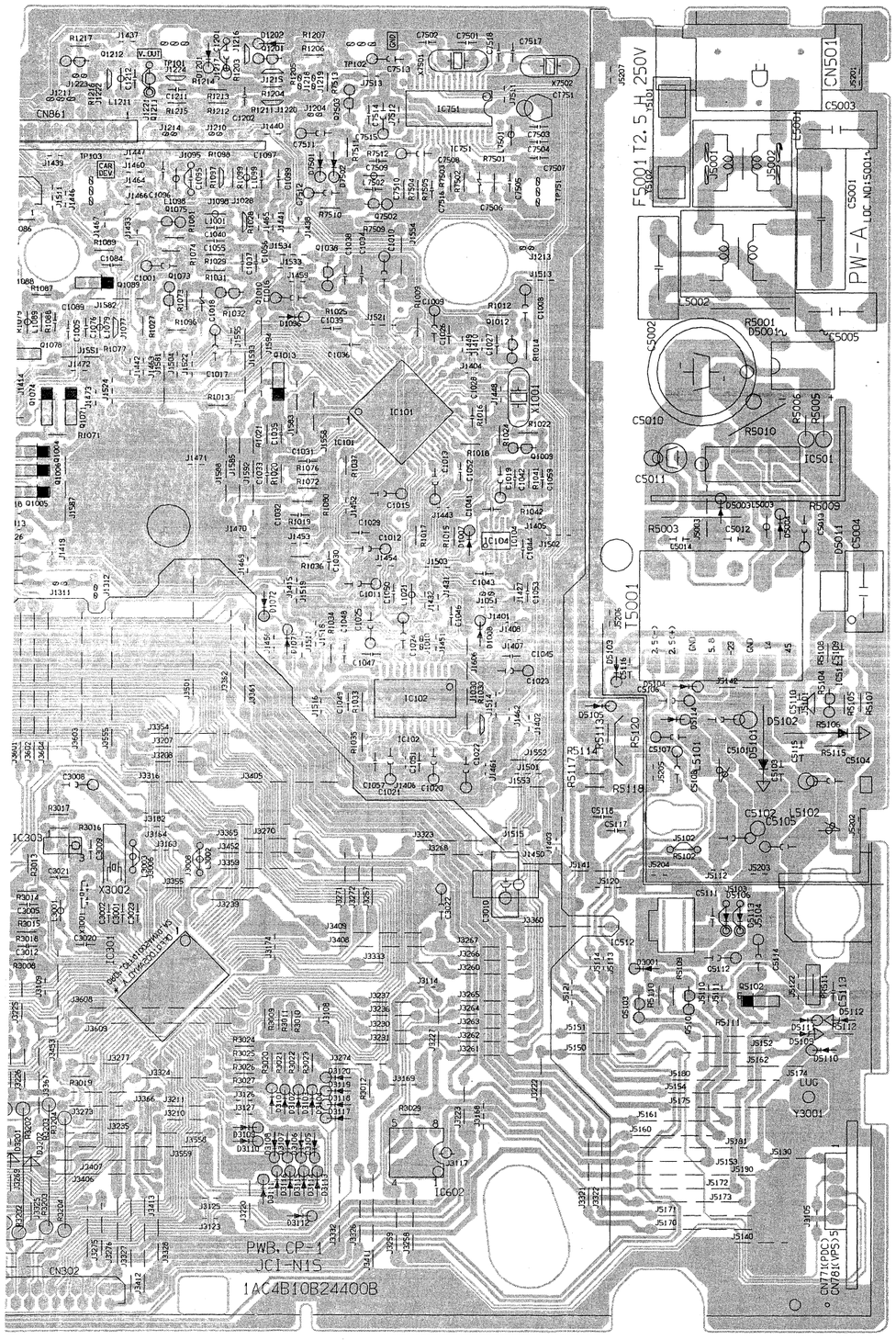
VP-1



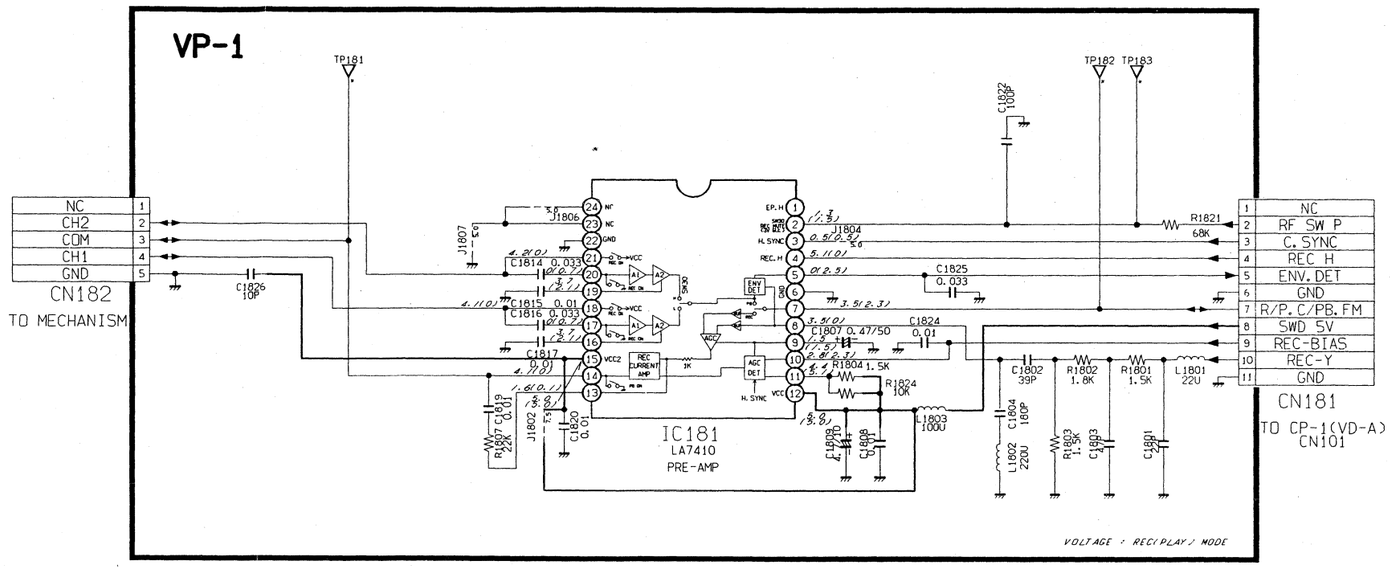
● Parts
in th

● Parts not included in the circuit diagram a
in the mounting diagram, but they are no

● Information for SLV-X211ME also includes information for SLV-X211MEJ/SG.

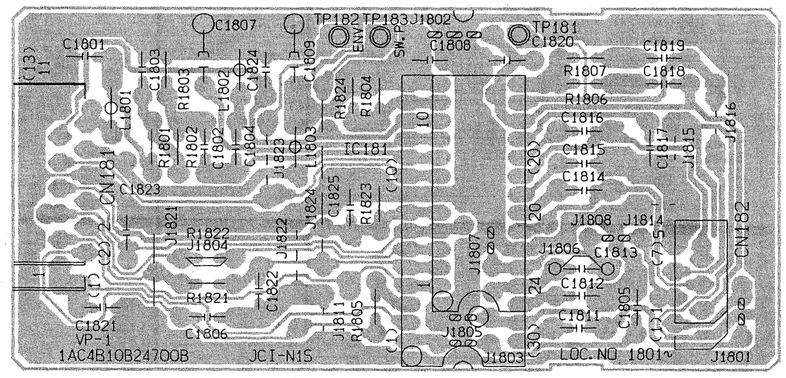


VP-1 BOARD VIDEO PRE-AMP CIRCUIT DIAGRAM



● Parts not included in the circuit diagram are shown in the mounting diagram, but they are not actually mounted.

VP-1 P. W. B



● Parts not included in the circuit diagram are shown in the mounting diagram, but they are not actually mounted.

CP-1 BOARD (VD-A) VIDEO CIRCUIT DIAGRAM

VD-A

TO TNA: VD SEL IN, VD (TU), VD (CV)

TO SYA: OSD CS/P OFF MUTE, FSS IN/SEL V, PB H, X1 SD/6D, X2 NAP H, ORC DATA 2, ORC DATA 1/RF CTL, ORC DATA 0/PKG CTL, VD MUTE, ENV. DET, REC H, PAL-L (MES H)

IC104 LA7356 MESECAM DISCRIMINATION

IC101 LA7435 VIDEO Y/C PROCESS

IC111 LA7221 INPUT SELECT

IC102 LC89970 CCD DELAY

VIDEO IN / VIDEO OUT (JK121)

CN101: NC, RF SW P, C. SYNC, REC H, ENV. DET, GND, R/P. C/PB. FM, SWD 5V, REC-BIAS, REC-Y, GND

TO VP-1 CN181

TO SVA: RF SW P., V LOCK P., C. SYNC, FSC

TO PWA: GND, ALWAYS 12V, ALWAYS 5V, SWD 5V

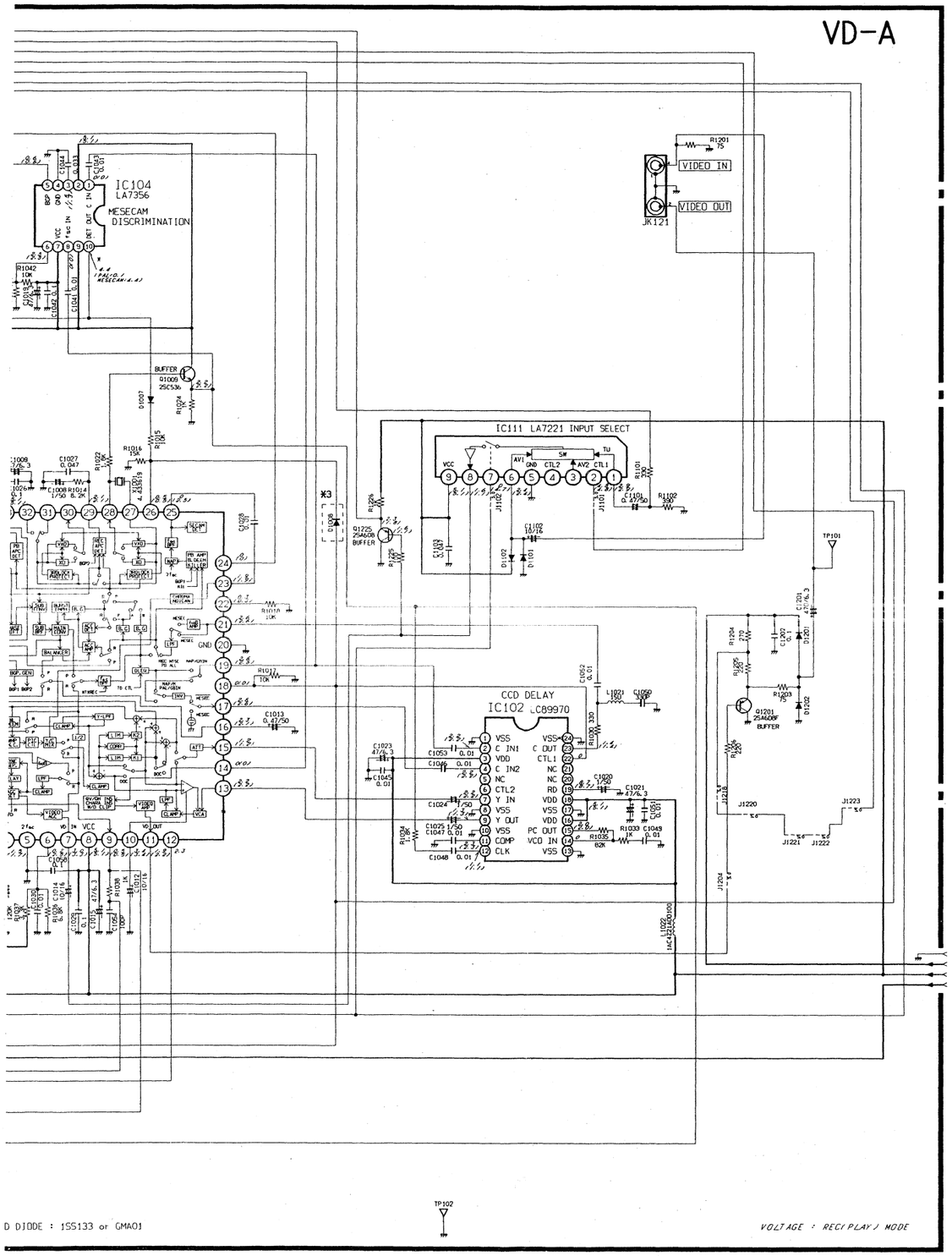
NOTE: NOT USE : OPEN CIRCUIT

	✻1	✻2	✻3	✻4
SLV-X21ME SLV-X21SA SLV-X21PS	USE	USE	USE	USE
SLV-236EE	NOT USE	NOT USE	NOT USE	NOT USE

NOT SPECIFIED DIODE : 1SS133 or GMA01

VOLTAGE : REC(PLAY) MODE

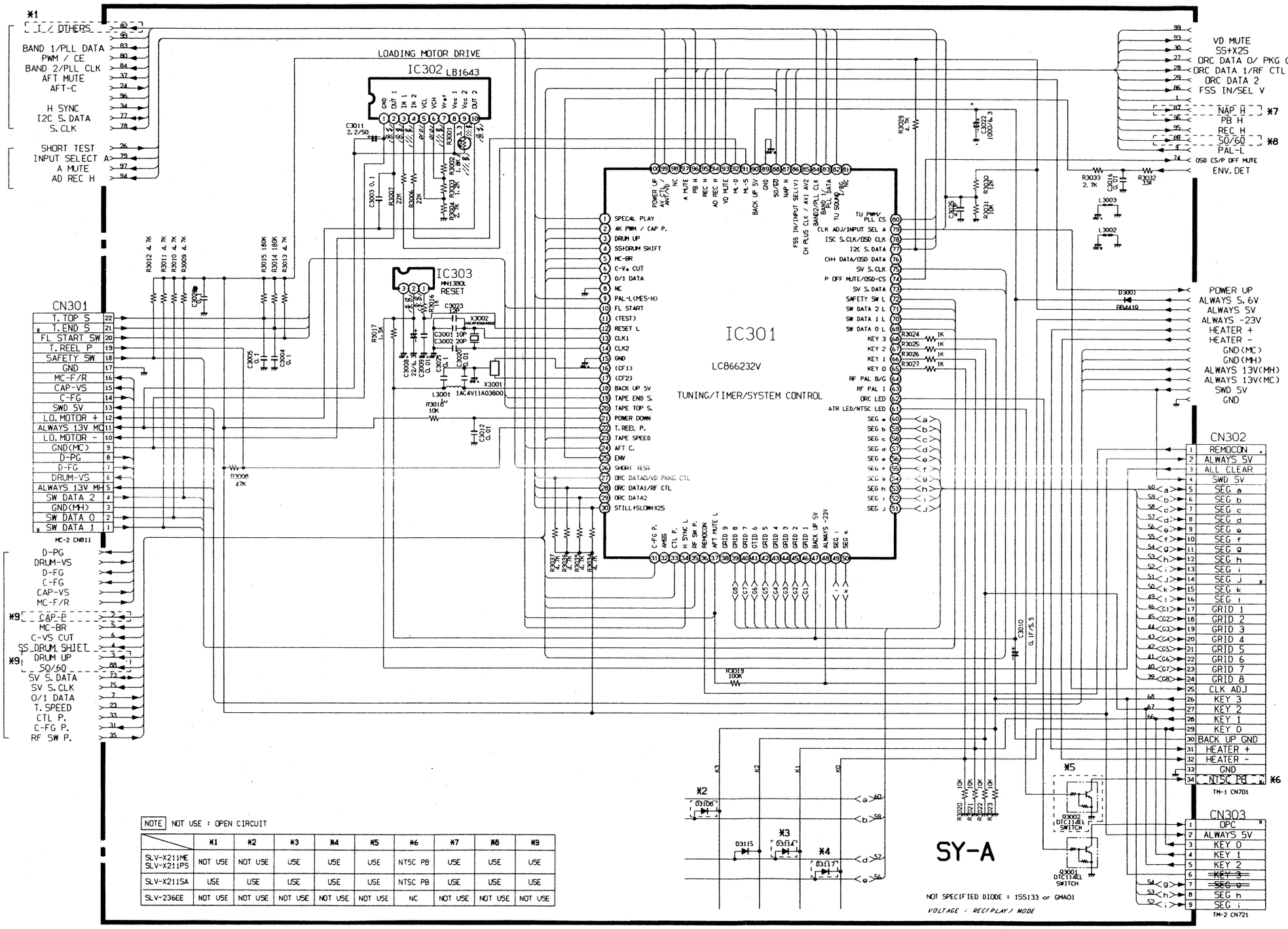
) (VD-A) VIDEO CIRCUIT DIAGRAM



VIDEO CIRCUIT WAVEFORMS

TEST LOCATION	WAVEFORM	MODE / LEVEL	TEST LOCATION	WAVEFORM	MODE / LEVEL
IC 101 Pin 1		REC, EE 0.5Vp-p	IC 101 Pin 38 (PB CHROMA IN)		PB 0.3Vp-p
IC 101 Pin 7 (VIDEO IN)		REC, EE 1.0Vp-p	IC 101 Pin 43 (PB FM IN)		PB 0.6Vp-p
IC 101 Pin 11 (VIDEO OUT)		REC, EE 2.0Vp-p	IC 101 Pin 44 TP103 (REC FM OUT)		REC 2.0Vp-p
IC 101 Pin 11 (VIDEO OUT)		PB 2.5Vp-p	IC 101 Pin 46		REC, EE 0.5Vp-p
IC 101 (UPPER) Pin 11 (LOWER) Pin 14		STILL (UPPER) 2.0Vp-p (LOWER) 5.0Vp-p	IC 101 Pin 46		PB 0.6Vp-p
IC 101 Pin 13 Pin 15		PB 0.4Vp-p	IC 101 Pin 47		REC, EE 0.5Vp-p
IC 101 Pin 17 Pin 19 Pin 21		PB 0.4Vp-p	IC 101 Pin 47		PB 0.6Vp-p
IC 101 Pin 38 (REC CHROMA OUT)		REC 0.4Vp-p			

CP-1 BOARD (SY-A) SYSTEM CONTROL CIRCUIT DIAGRAM

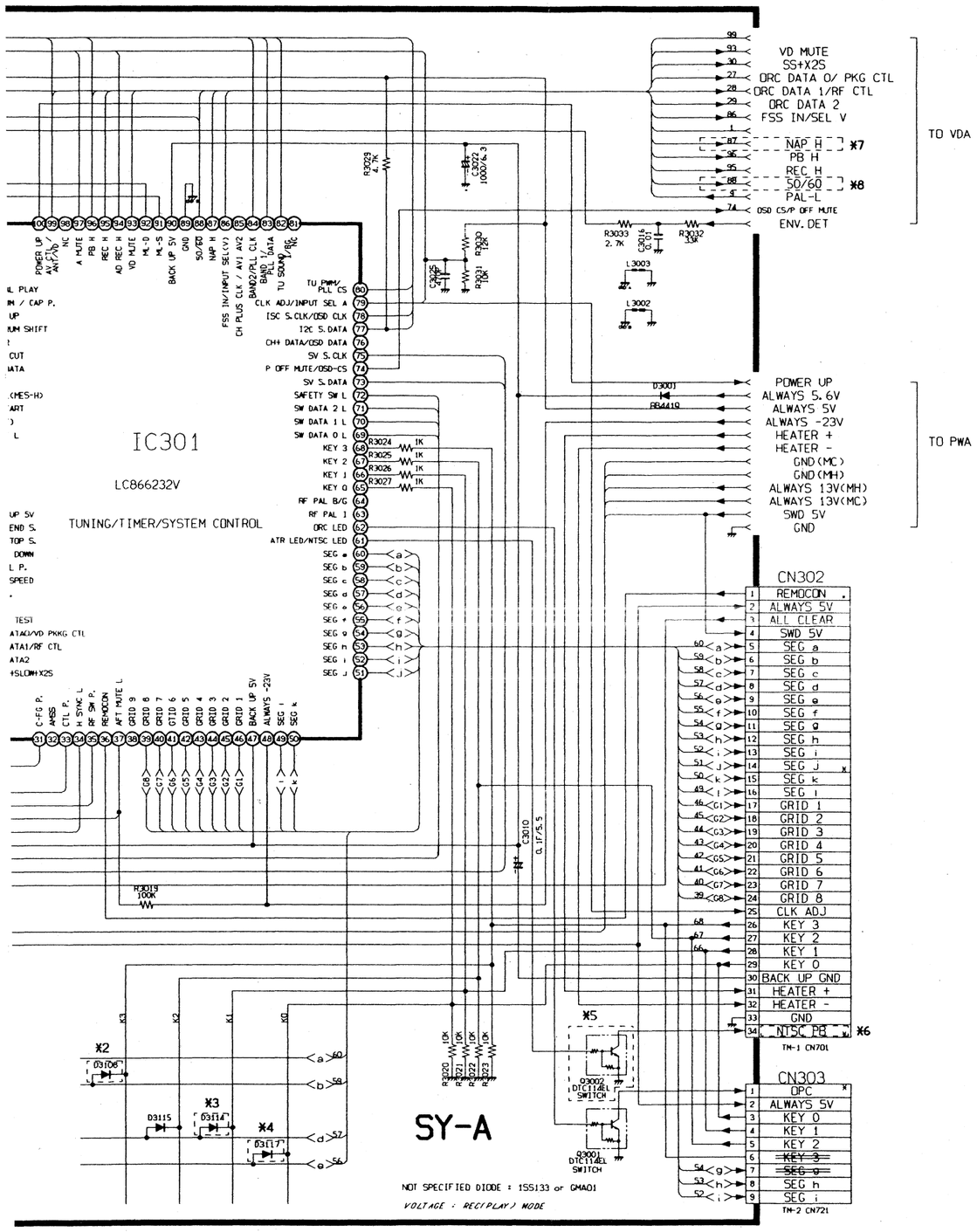


NOTE NOT USE : OPEN CIRCUIT	✱1	✱2	✱3	✱4	✱5	✱6	✱7	✱8	✱9
SLV-X211ME SLV-X211PS	NOT USE	NOT USE	USE	USE	USE	NTSC PB	USE	USE	USE
SLV-X211SA	USE	USE	USE	USE	USE	NTSC PB	USE	USE	USE
SLV-236EE	NOT USE	NOT USE	NOT USE	NOT USE	NOT USE	NC	NOT USE	NOT USE	NOT USE

IC301 SYSTEM CO

No.	Name
1	S - PLAY
2	CAP P.
3	DRUM UP
4	SS + DRUM SHIFT
5	MC - BR
6	C - Vs CUT
7	0 / 1 DATA
8	-
9	PAL- L(MESECAM H)
10	FL- START SW
11	-
12	RESET
13	CLK 1
14	CLK 2
15	VSS
16	CF 1
17	CF 2
18	VDD
19	T. END S.
20	T. TOP S.
21	POWER DOWN
22	T. REEL P.
23	TAPE SPEED
24	AFT - C
25	ENV.
26	SHORT TEST
27	ORC DATA 0
28	ORC DATA 1
29	ORC DATA 2
30	STILL + SLOW
31	C - FG P.
32	-
33	CTL P.
34	H SYNC
35	RF SW P.
36	REMOCON
37	AFT MUTE
38	-
39	G8
40	G7
41	G6
42	G5
43	G4
44	G3
45	G2
46	G1
47	VDD
48	V LOAD
49	SEG I
50	SEG k
51	SEG j
52	SEG i
53	SEG h
54	SEG g

CONTROL CIRCUIT DIAGRAM



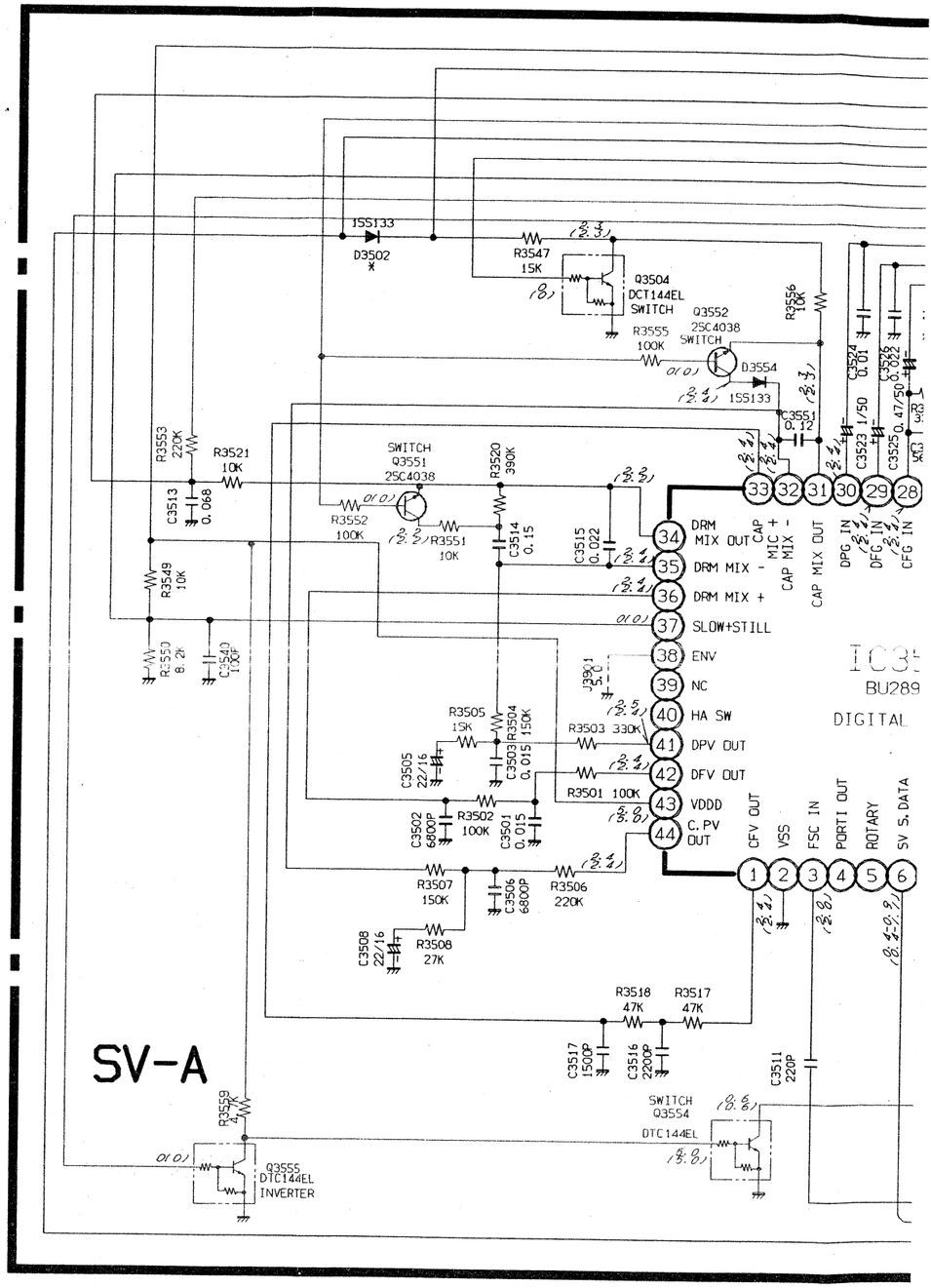
IC301 SYSTEM CONTROL,TIMER, & TUNING CONTROL MPU PIN FUNCTIONS TABLE

No.	Name	I/O	I/O Signal Function
1	S - PLAY	O	Signal for indicating CUE , REV , STILL and SLOW modes.
2	CAP P.	O	Gain down control for Head Motor Amplifier at SLOW mode.
3	DRUM UP	O	Head drum motor rotation speed up signal.
4	SS + DRUM SHIFT	O	Signal for indicating SLOW/STILL modes and alternation of drum motor control data. (3 value voltage)
5	MC - BR	O	Brake signal for capstan motor.
6	C - Vs CUT	O	Cut off for capstan motor control voltage in SLOW / STILL modes.
7	0 / 1 DATA	I	CTL pulse duty detection signal input. Used for VISS detection.
8	-	-	-
9	PAL- L(MESECAM H)	I	PAL mode indication signal input.
10	FL- START SW	I	Switch input indicating start of cassette loading or discharge by cassette mechanism.
11	-	-	-
12	RESET	I	Initial reset terminal for this IC.
13	CLK 1	-	Clock OSC during power failures.
14	CLK 2	-	Frequency is 32.672kHz.
15	VSS	-	Ground terminal
16	CF 1	-	IC clock OSC terminal.
17	CF 2	-	Frequency is 13.92MHz.
18	VDD	-	IC power supply terminal.(5Vdc)
19	T. END S.	I	Sensor signal input for tape end detection.
20	T. TOP S.	I	Sensor signal input for tape beginning detection.
21	POWER DOWN	I	Power failure detection terminal.
22	T. REEL P.	I	Pulse input for detection of take-up reel table rotation.
23	TAPE SPEED	I	Input of result of tape speed discrimination by digital servo IC.
24	AFT - C	I	Tuner AFT S-curve signal input for tuner AFT control.
25	ENV.	I	Video head envelope detection signal input for ATR function.
26	SHORT TEST	I	REC mode indication signal input (REC 5V).
27	ORC DATA 0	O	Optimum picture control (ORC) data signal.
28	ORC DATA 1	O	Signal control to video recording current, EQ - amp
29	ORC DATA 2	O	characteristics, and PB picture frequency peaking.
30	STILL + SLOW	O	STILL or SLOW modes indication signal output.
31	C - FG P.	I	FG signal input of capstan motor.
32	-	-	-
33	CTL P.	I	CTL head recording / playback pulse signal input.
34	H SYNC	I	Sync. signal input for existing channel discrimination and TV system discrimination.
35	RF SW P.	I	Input of RF switching pulse created by head drum PG.
36	REMOCON	I	Remote control signal input.
37	AFT MUTE	O	"H" output during TU AFT mute. (V-syn model only)
38	-	-	-
39	G8	O	
40	G7	O	
41	G6	O	
42	G5	O	Display grid outputs (FLD).
43	G4	O	
44	G3	O	
45	G2	O	
46	G1	O	
47	VDD	-	IC power supply input.(5Vdc)
48	V LOAD	O	-23V input for FLD drive.
49	SEG I	O	
50	SEG k	O	
51	SEG j	O	Display segment outputs (FLD).
52	SEG i	O	(Includes key-scan output)
53	SEG h	O	
54	SEG g	O	

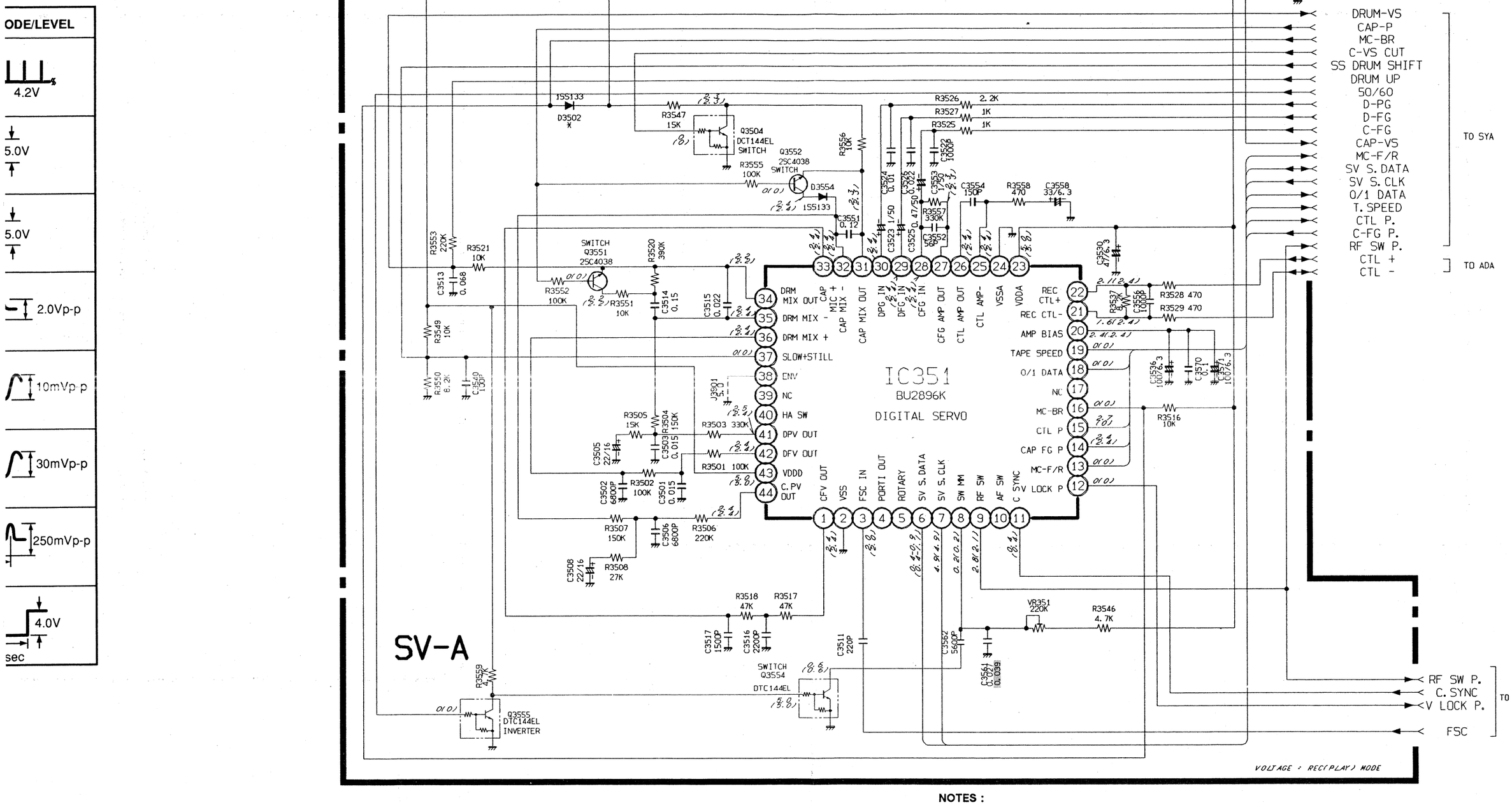
No.	Name	I/O	I/O Signal Function
55	SEG f	O	
56	SEG e	O	
57	SEG d	O	Display segment outputs (FLD).
58	SEG c	O	(Includes key-scan output)
59	SEG b	O	
60	SEG a	O	
61	NTSC / ATR LED	O	Signal for NTSC mode or ATR indicators LED drive.
62	ORC LED	O	Signal for optimum picture control mode LED drive.
63	RF PAL I	O	Signal for RF output TV-system setting (PAL - I).
64	RF PAL B/G	O	Signal for RF output TV-system setting (PAL - B/G).
65	KEY IN 0	I	
66	KEY IN 1	I	Operation key data inputs.
67	KEY IN 2	I	
68	KEY IN 3	I	
69	SW DATA 0	I	
70	SW DATA 1	I	3-bit data indicating operation position of mechanism.
71	SW DATA 2	I	
72	SAFETY SW	I	Terminal for accidental erasure prevention switch. No operation to record mode while "HIGH" is input.
73	SV S. DATA	O	Output 8-bit X 4 serial data giving operation mode and tracking data,etc., to digital servo IC.
74	OSD CS	O	Chip enable (access) signal output to OSD IC.
	P OFF MUTE	O	Video signal mute at power off mode.
75	SV S. CLK	O	The clock pulse for digital servo IC.
76	S. DATA (OSD/CH+)	I/O	Terminal for communication of respective data with OSD IC and CH+ input/output source selection IC.
77	I2C S.DATA	I/O	Data exchange with tuning memory IC and VPS IC.
78	S. CLK (OSD/I2C)	O	The clock pulse for OSD IC and tuning memory IC.
79	INPUT SEL A	O	Signal for selecting audio input source.
80	PLL CS	O	Chip enable signal output to tuner PLL tuning system IC. (F-syn model)
	TU PWM	O	Tuning voltage output (PWM signal). (V-syn model)
81	-	-	-
82	TU SOUND (I/BG)	O	TV system indication signal output (PAL I or BG).
83	BAND 1	O	Tuning band data(BAND 1 and 2 ; for V-syn model).
	PLL DATA	O	Data exchange with tuner PLL IC (for F-syn model).
84	BAND 2	O	BAND 1 and 2 ; (L,L)=VHF-LOW (L,H)=VHF-HIGH (H,L)=UHF (H,H)=SKIP. (for V-syn model)
	PLL CLK	O	The clock for PLL IC of tuner unit (for F-syn model).
85	CH+ CLK	O	The clock for CH+ input/output source selection IC.
	AV1 / AV2	O	Signal for selecting AV-input (video/audio) source.
86	INPUT SEL V	O	Signal for selecting video input source.
	FSS IN	I	CH+ mode control signal input (CH+ model).
87	NAP H	O	" H " output during NTSC (NAP) playback mode.
88	50 / 60	O	" LOW " output during NTSC (NAP) mode. (60 field mode)
89	VSS	-	IC ground terminal.
90	VDD	-	IC power supply input.(5Vdc)
91	ML- S	O	Loading motor rotation speed (low / medium / high) indication signal.
92	ML- D	O	Loading motor rotation direction (FWD / REV) indication signal.
93	VD MUTE	O	Signal for disable video output.
94	AD REC H	O	Signal for indicating audio recording.
95	REC H	O	Signal for indicating recording mode.
96	PB H	O	Signal for indicating playback mode.
97	A MUTE	O	"H" output for disable audio output signal.
98	-	-	-
99	AV CTL	O	AV terminal (pin8 of 21pins AV socket) control signal output.
	ANT / VTR	O	Selection the RF source of ANTENNA or VTR.
100	POWER UP	O	"HIGH" output except when power is off. Indicating that power is ON.

SERVO CIRCUIT WAVEFORMS (IC351:BU2896 Series)

TEST LOCATION	WAVEFORM & MODE/LEVEL	TEST LOCATION	WAVEFORM & MODE/LEVEL
Pin 40 (H.A.SWITCHING)	SLOW PB, 5.0V, 20msec 20msec	**Pin 11** (COMPOSITE SYNC INPUT)	4.2V, T=20msec
Pin 42 (PWM)	5.0V, 8.66KHz	**Pin 14** (C-FG PULSE)	5.0V, 1513Hz
Pin 41,44,1 (PWM)	5.0V, 69.27KHz	**Pin 15** (CTL PULSE)	PB, 850µsec, 5.0V, 40msec
Pin 3 (FSC INPUT)	0.3Vp-p, 4.43MHz	**Pin 26** (CTL AMP OUT)	PB, 2.0Vp-p, 40msec
Pin 5 (ROTARY)	PB, 5.0V, 20msec 20msec	**Pin 28** (C-FG INPUT)	10mVp-p, 0.66msec
Pin 8 (D-PG MM)	2msec, 2.5V, 7msec	**Pin 29** (D-FG INPUT)	30mVp-p, 1.33msec
Pin 9 (RF SW PULSE)	5.0V, 20msec 20msec	**Pin 30** (D-PG INPUT)	250mVp-p, 40msec
Pin 10 (AF SW PULSE)	PB, 5.0V, 20msec 20msec	**Pin 38** (ENV.SW INPUT)	SLOW PB, 4.0V, 20msec 20msec



CP-1 BOARD (SV-A) SERVO CIRCUIT DIAGRAM



NOTES :

——— : Common parts for SLV-X211ME, SLV-X211PS, SLV-X211SA & SLV-236EE

——— : The parts for SLV-X211ME, SLV-X211PS & SLV-X211SA.

The parts marked ▒▒▒ is SLV-236EE.

ODE/LEVEL

4.2V

5.0V

5.0V

2.0Vp-p

10mVp-p

30mVp-p

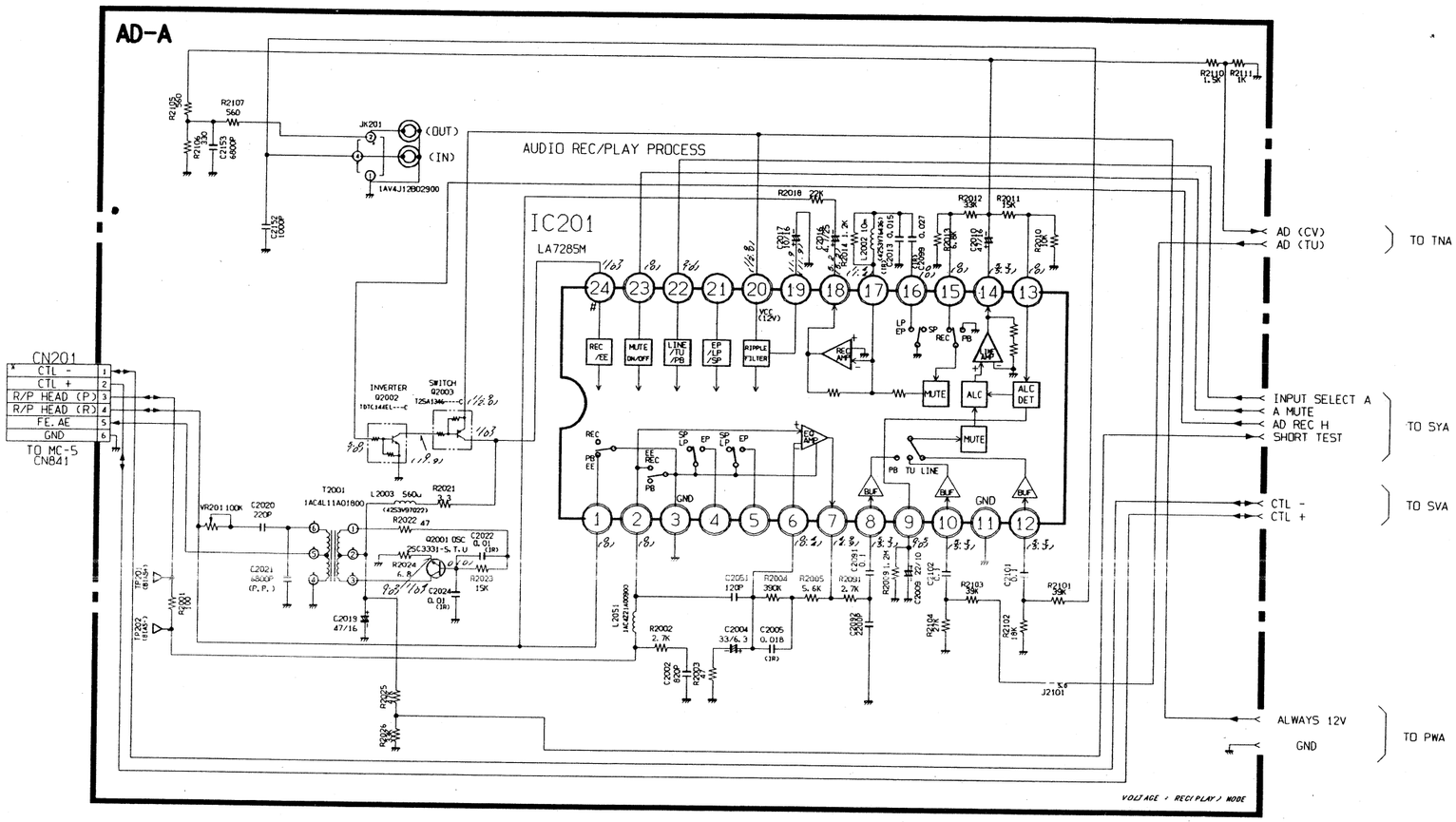
250mVp-p

4.0V

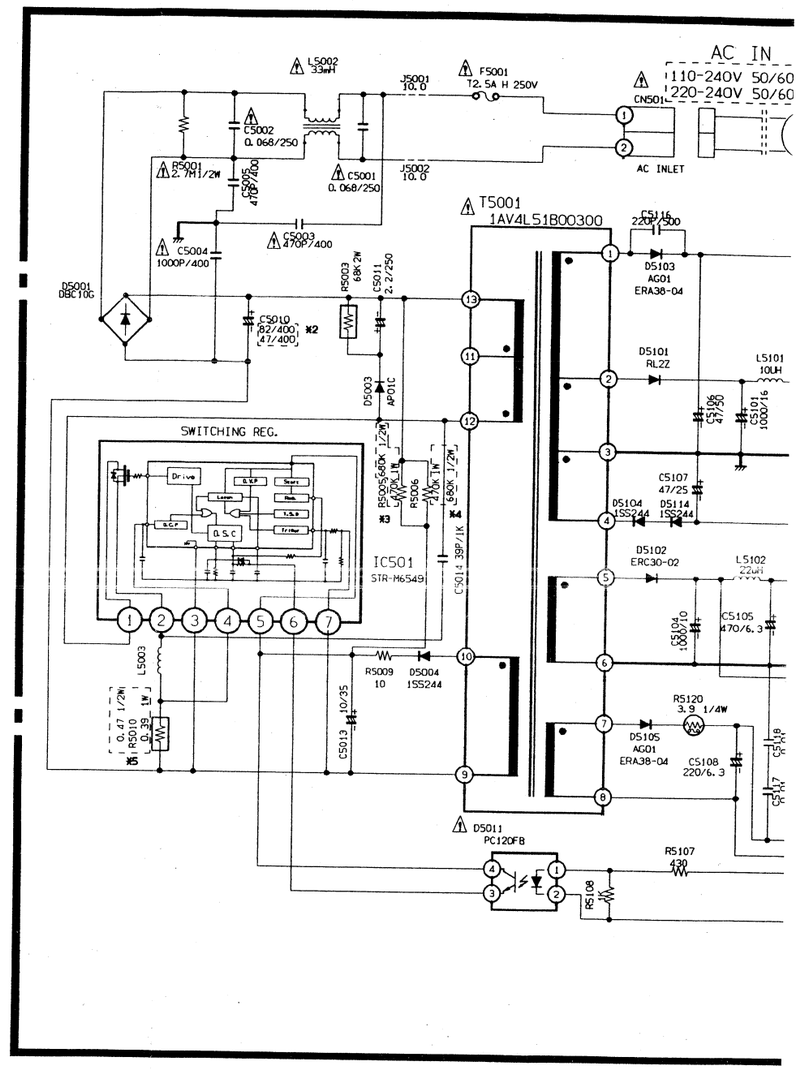
sec

7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

CP-1 BOARD (AD-A) AUDIO CIRCUIT DIAGRAM

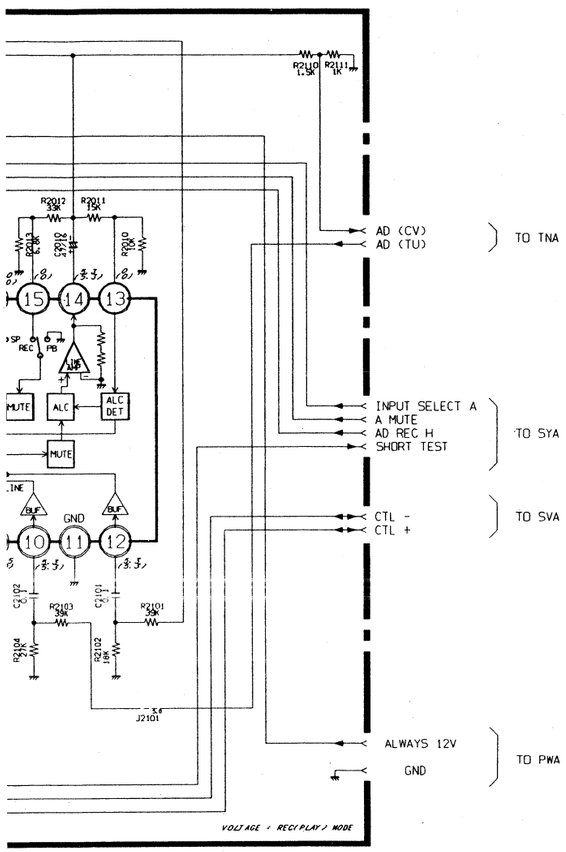


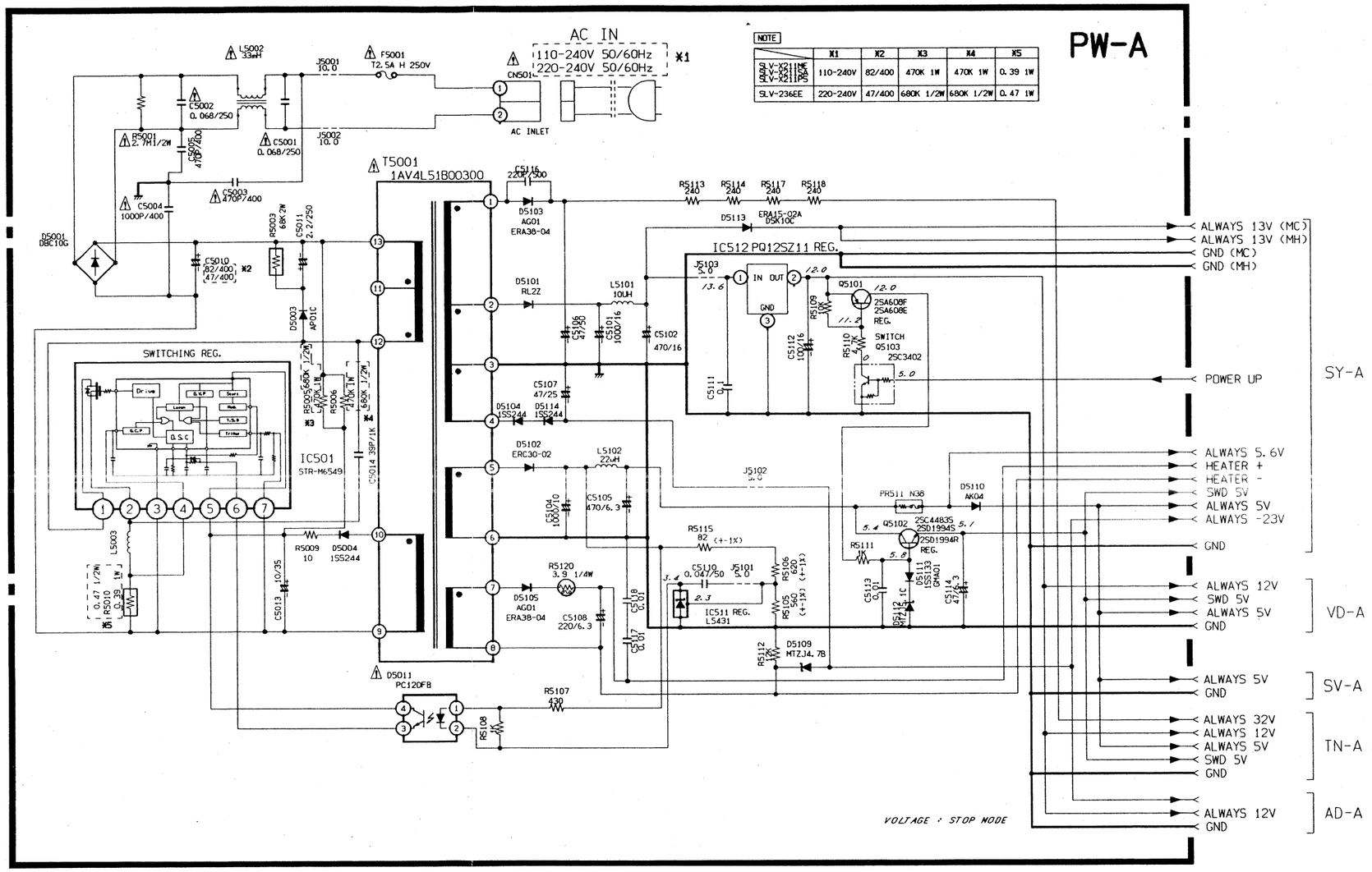
CP-1 BOARD (PW-A) POWER S



M

CP-1 BOARD (PW-A) POWER SUPPLY CIRCUIT DIAGRAM

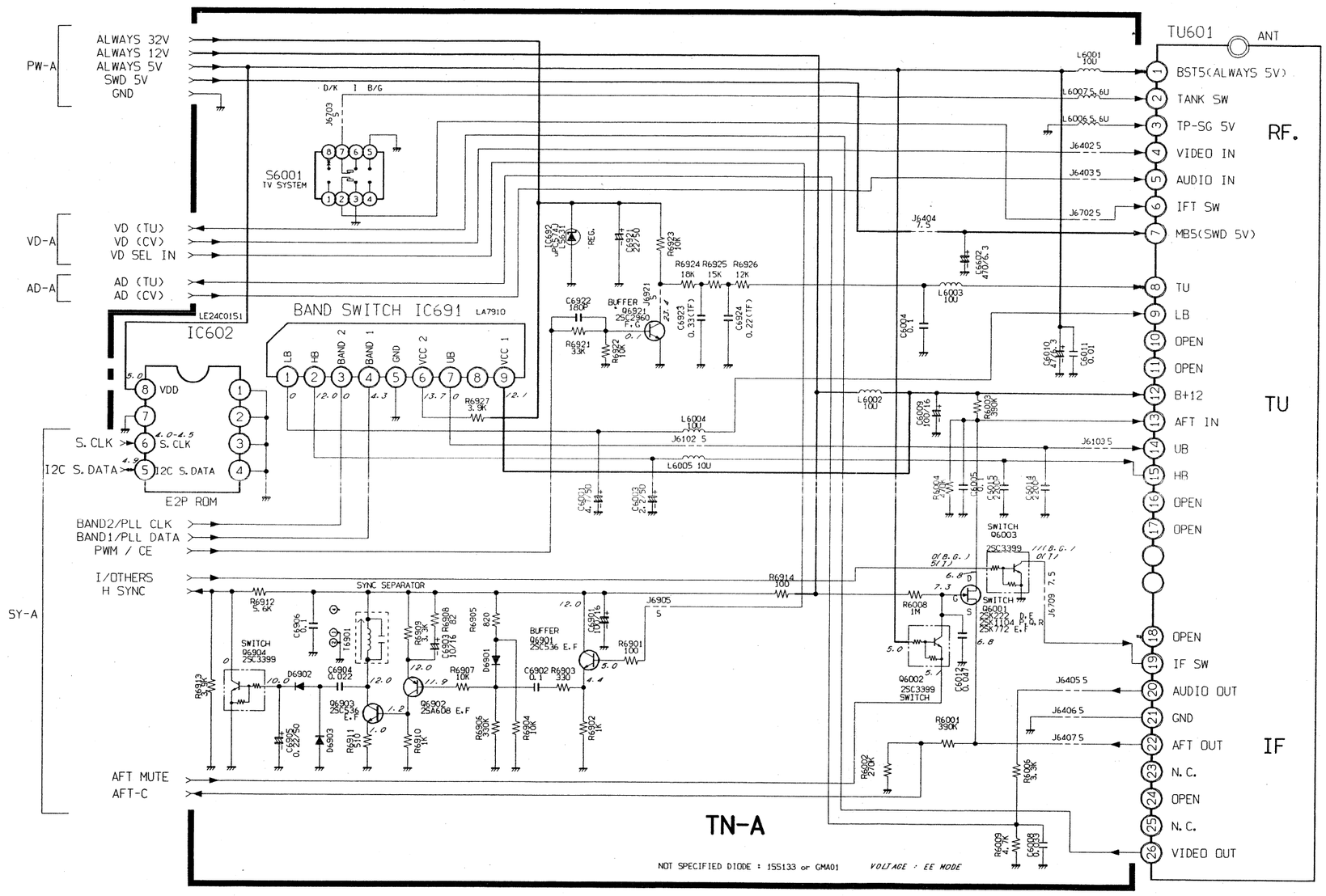




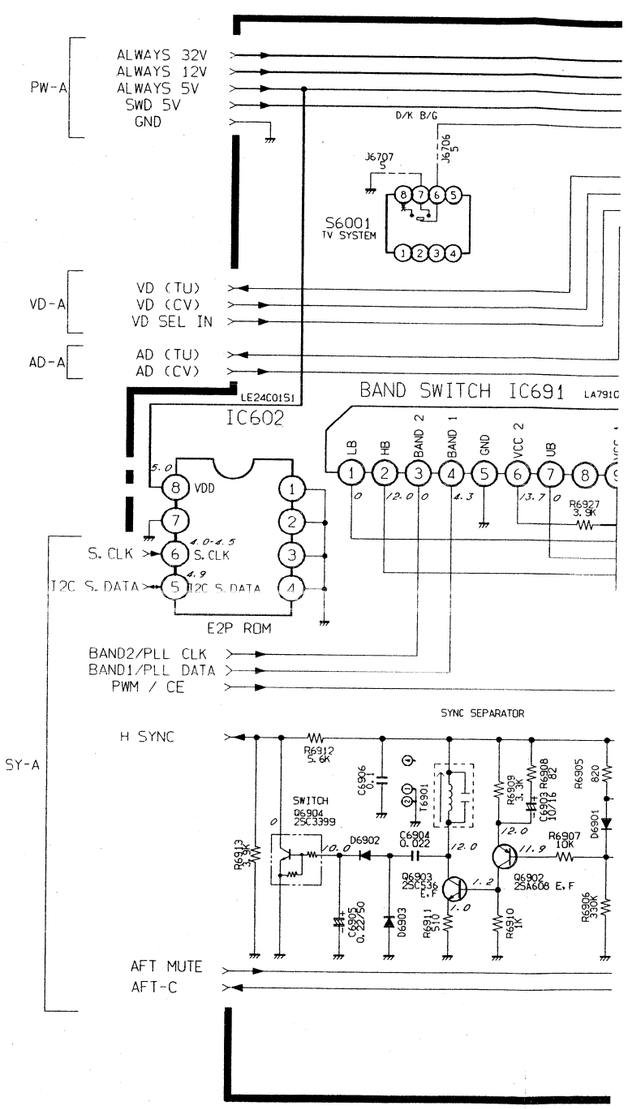
NOTE	X1	X2	X3	X4	X5
SLV-X211MK SLV-X211PA SLV-X211PS	110-240V	82/400	470K 1W	470K 1W	0.39 1W
SLV-236EE	220-240V	47/400	680K 1/2W	680K 1/2W	0.47 1W

8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

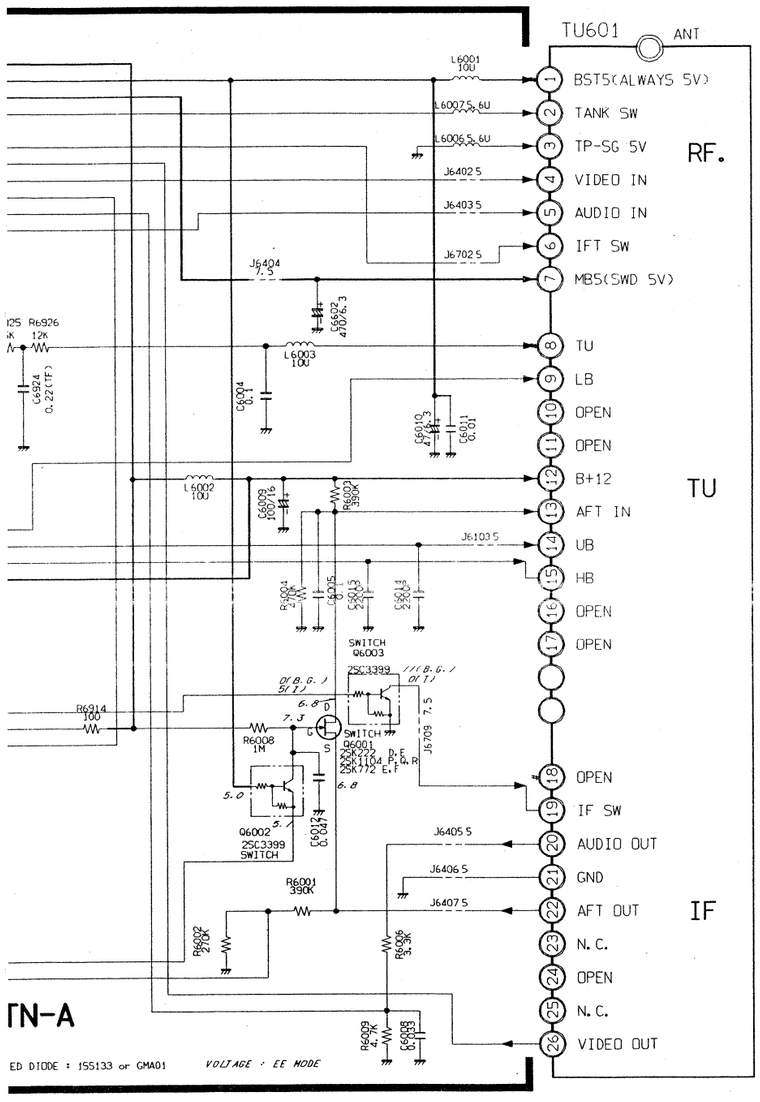
CP-1 BOARD (TN-A) TUNER IF CONNECTION CIRCUIT DIAGRAM (SVL-X211ME, SLV-X211PS&SLV-236EE)



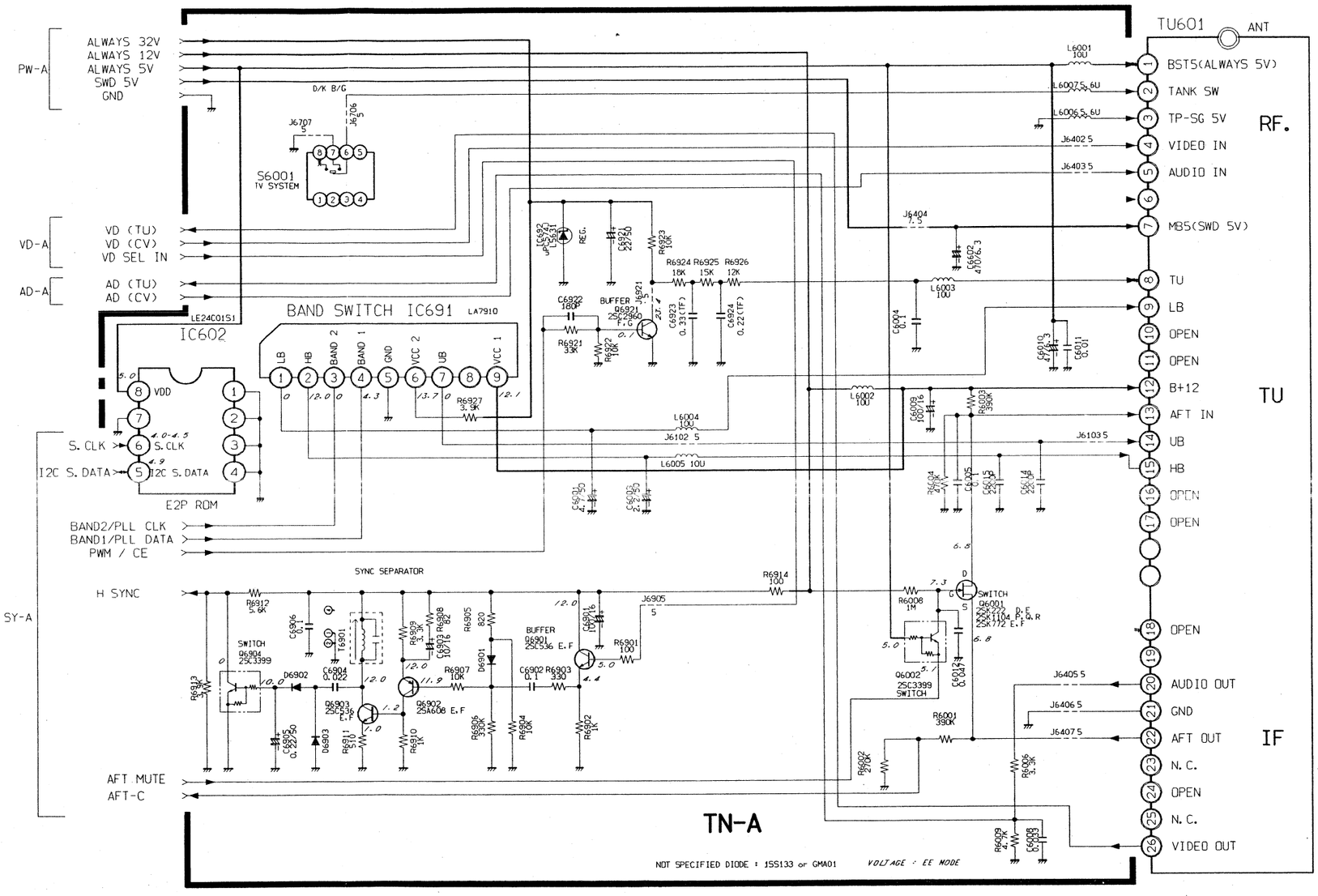
CP-1 BOARD (TN-A)



\GRAM (SVL-X211ME, SLV-X211PS&SLV-236EE)

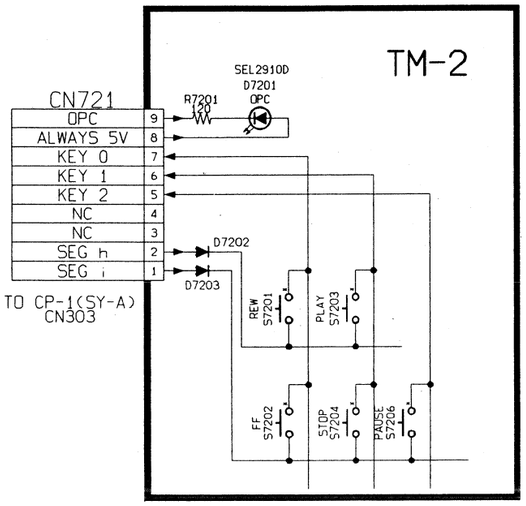


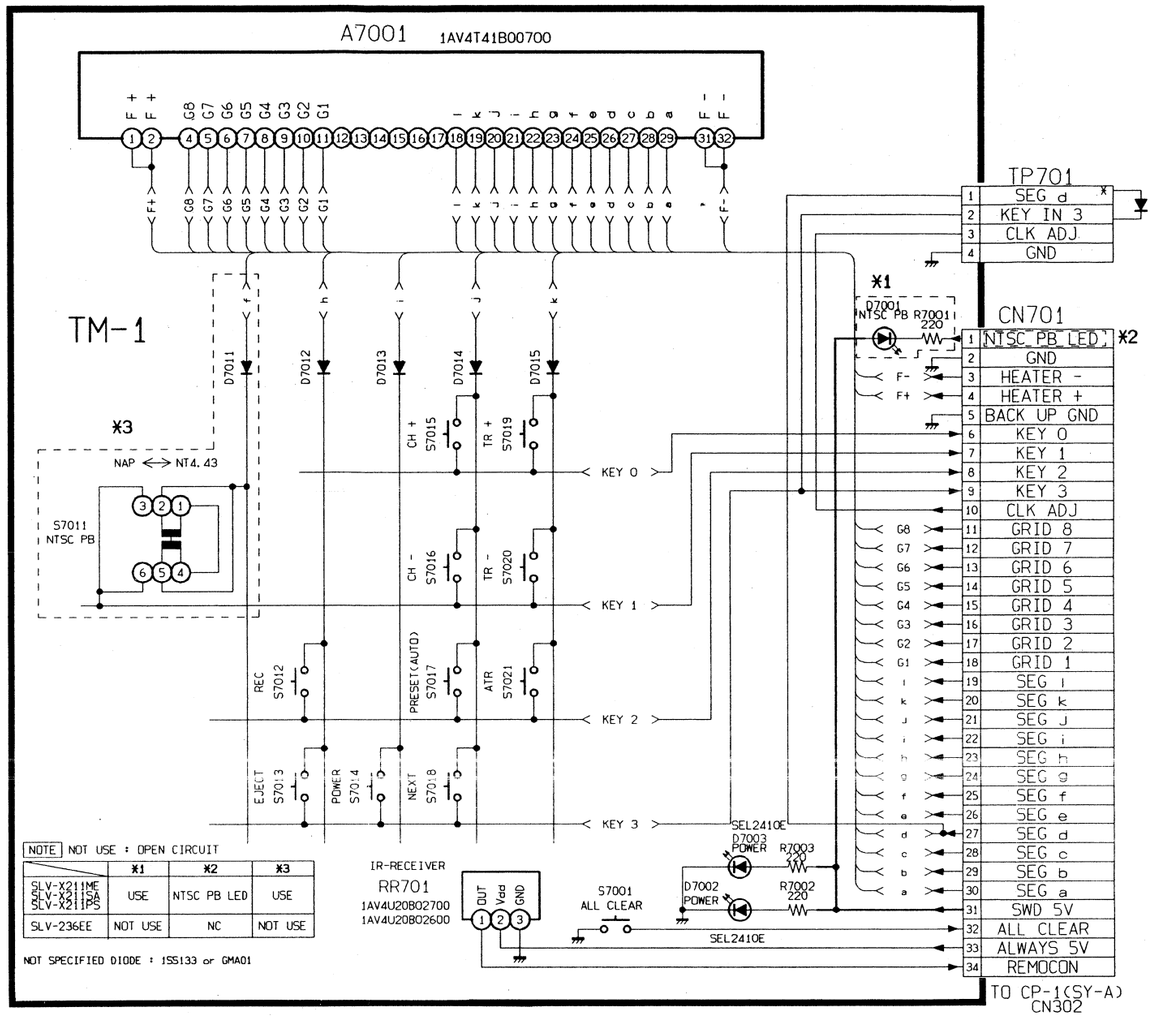
CP-1 BOARD (TN-A) TUNER IF CONNECTION CIRCUIT DIAGRAM (SVL-X211SA)

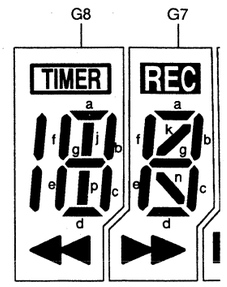


7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

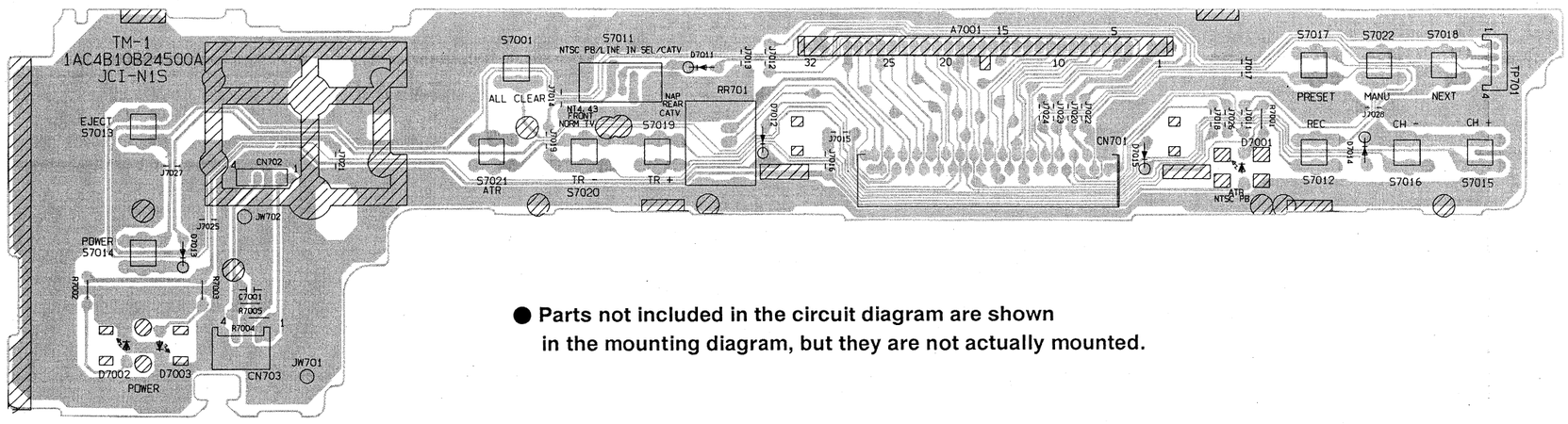
TM-1, 2 BOARD DISPLAY (FLD) & SWITCH CIRCUIT DIAGRAM







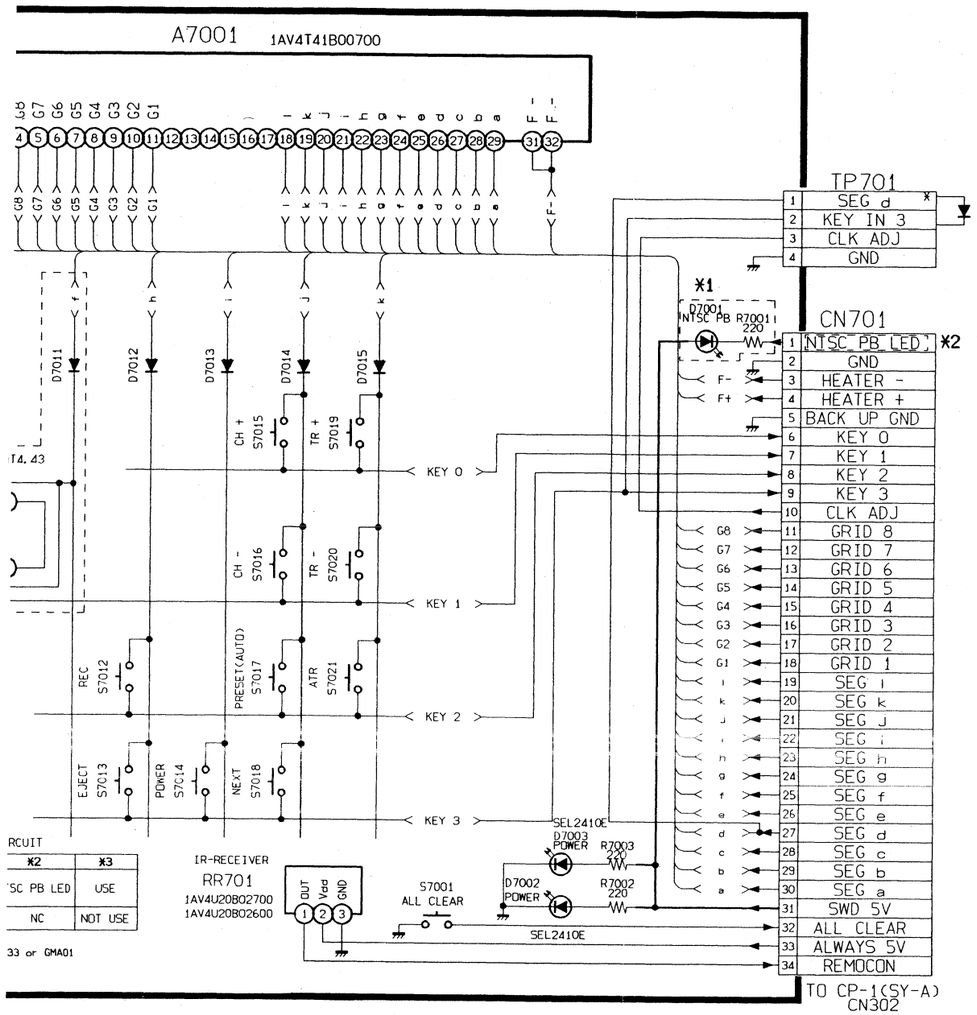
TM-1 P. W. B



● Parts not included in the circuit diagram are shown in the mounting diagram, but they are not actually mounted.

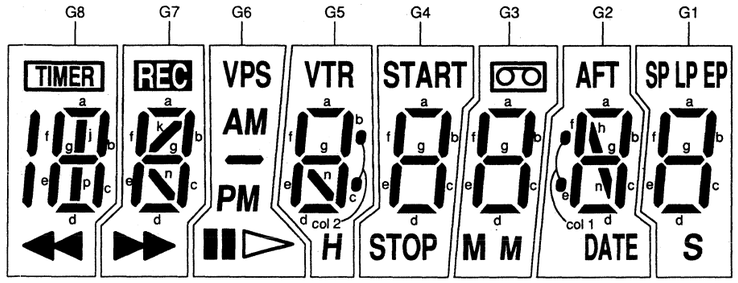
● Parts not
in the mo

FLD) & SWITCH CIRCUIT DIAGRAM



A7001 DISPALY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE

GRID & SEGMENT ASSIGNMENT

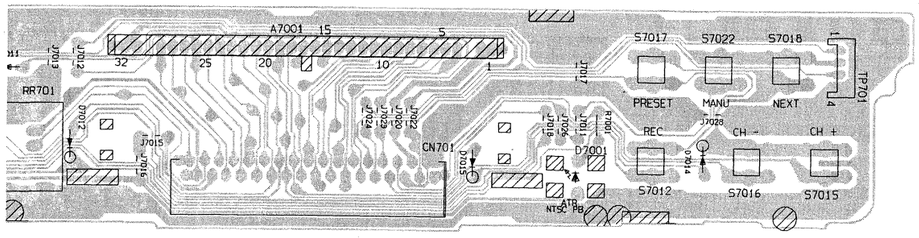


ANODE CONNECTION

GRID / SEGMENT	G8	G7	G6	G5	G4	G3	G2	G1
a	TIMER	REC	VPS	VTR	START	▭	AFT	SP
b	—	k	AM	—	—	—	DATE	LP
c	a	a	▬	a	a	a	a	a
d	b	b	PM	b	b	b	b	b
e	c	c	—	c	c	c	c	c
f	d	d	—	d	d	d	d	d
g	e	e	—	e	e	e	e	e
h	f	f	—	f	f	f	f	f
i	g	g	—	g	g	g	g	g
j	j,p	n	▮ (left)	n	—	—	h,n	—
k	▮	—	▮ (right)	col 2	—	M (right)	col 1 (upper)	S
l	◀◀	▶▶	▷	H	STOP	M (left)	col 1 (lower)	EP

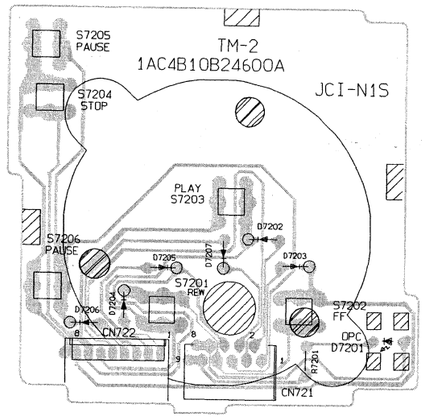
● Parts not included in the circuit diagram are shown in the mounting diagram, but they are not actually mounted.

TM-1 P. W. B



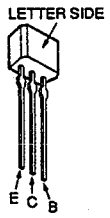
ed in the circuit diagram are shown
diagram, but they are not actually mounted.

TM-2 P. W. B

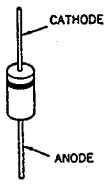


SEMICONDUCTOR LEAD LAYOUTS.

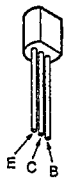
DTA124ES
DTC144ES
2SA1175-HFE
2SC2785-HFE



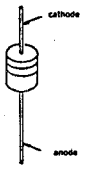
AK04-V2
AP0IC-VO
EM-1Z
ERC30-02L38
RL2Z-LF-B1
1SS83



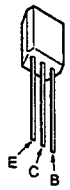
2SC458K



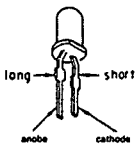
MTZJ-5.1C
MTZJ-T-77-33C
RB441Q
UZ-4.7BSC
1SS120
1SS133T-77



DTC114ES
2SC2668

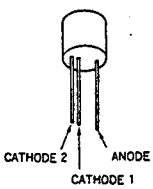


SEL2410E-D
SEL2910D-D



2SK772-E-AC

2SA937-Q
2SC2021



SECTION 5
MECHANISM SERVICE TECHNICAL INFORMATIONS

1. OUTLINE OF '94 MIDI MID-MOUNT MECHANISM

The '94 Midi mid-mount mechanism is used for video tape recorders shipped as new products of 1994. The '94 Midi mid-mount mechanism has the same basic structures as the P90 mechanism shipped in 1990 except the following. As this manual omits the description of parts which are the same as those of P90, please refer to the P90 Mechanism Service Technical Information.

Note: (9) to (11) of the followings have already been changed in the "P91 mechanism" and repeated in "Service Technical Information of P91 mechanism".

(1) Some models have new reel drive system parts (supply reel table, take up reel table, reel gear (S), reel gear (T), COMPL idler clutch). As these are not interchangeable with the older ones, be sure to check the parts list when replacing them.

(2) The main cam gear, load rack and load gear (T) have been replaced with new ones to further simplify the tape loading mechanism. Therefore, the load cam lever of the old mechanism is not required. The new tape loading mechanism is shown in the figure 2-1.

(3) The MC-2 and MC-3 boards between the loading motor and system control circuit have been replaced with new ones.
The gilt side of its MC-2 board is marked "T-MONO" in big letters. Its CN811 connector has 22 pins. VHJ-0104 is used as the relay board.

(4) The pulley bracket is no longer used and the special screw has been employed. [However, the pulley bracket is stil used in the P90 S VHS mechanism (P91 High speed FF/REW mechanism)]

(5) The shape of the clutch lever assembly has been partially changed and the damper is no longer used.

(6) The shape of the front helical gear of the loading motor has been partially changed and the washer is no longer used.

(7) The 4 screws for mounting the gear bracket assembly of the cassette holder mechanism have been reduced to 3 screws.

(8) Some models do not have the impedance roller.

(9) The height adjustment of the exit side fixed guide no longer required as the precision of the tape running system has been heightened.

(10) The form of MC-1 and MC-4 board connector (CN801) near the reel drive part has been changed.

(11) The auto head cleaner mechanism is used for cleaning the video head automatically during loading and unloading.

2. DESCRIPTION OF MECHANISM OPERATION

2-1. BASIC OPERATION MODE OF MECHANISM

The P-90 mechanism has its original modes such as given in Table 2-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, REC, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection / insertion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

Mechanism Mode	Mechanism Mode Switch 3	2	1	HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
EJECT	–	–	–		Eject position	Detected by FL start switch	EJECT
					Front loading/Unloading	← Cassette insertion through STOP or PLAY mode STOP from EJECT →	
SHORT REW	1	1	0		Take up operation in the tape end position	← Pre-rolling after detecting tape end with tape end sensor.	Low side of ⑥. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power ON↔OFF when the cassette is inserted completely. OFF	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	From PLAY to STOP From FF/REW to STOP	
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	ON From SLOW to STOP (or STILL)	STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	PLAY↔STILL From FF to F-SEARCH From F-SEARCH to FF	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY↔R-SEARCH From REW to R-SEARCH From R-SEARCH to REW	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Table 2-1

2-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available, with a view to optimization of parts mounting layout. (Fig. 2-1 and Fig. 2-2.)

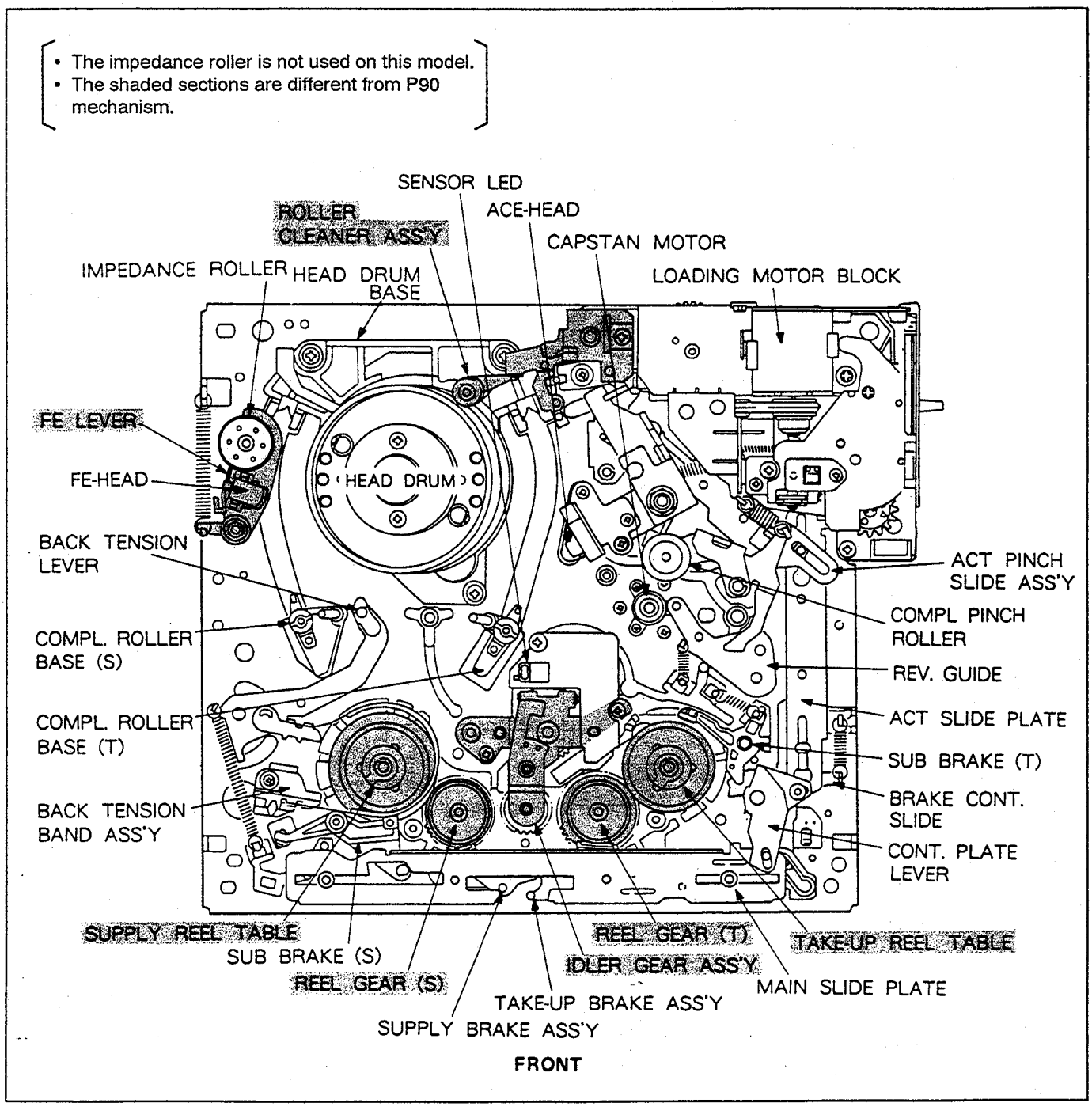


Fig. 2-1. Top View of Mechanism (Initial mode)

- Some models do not have the capstan soft brake.
- The shaded sections are different from P90 mechanism.

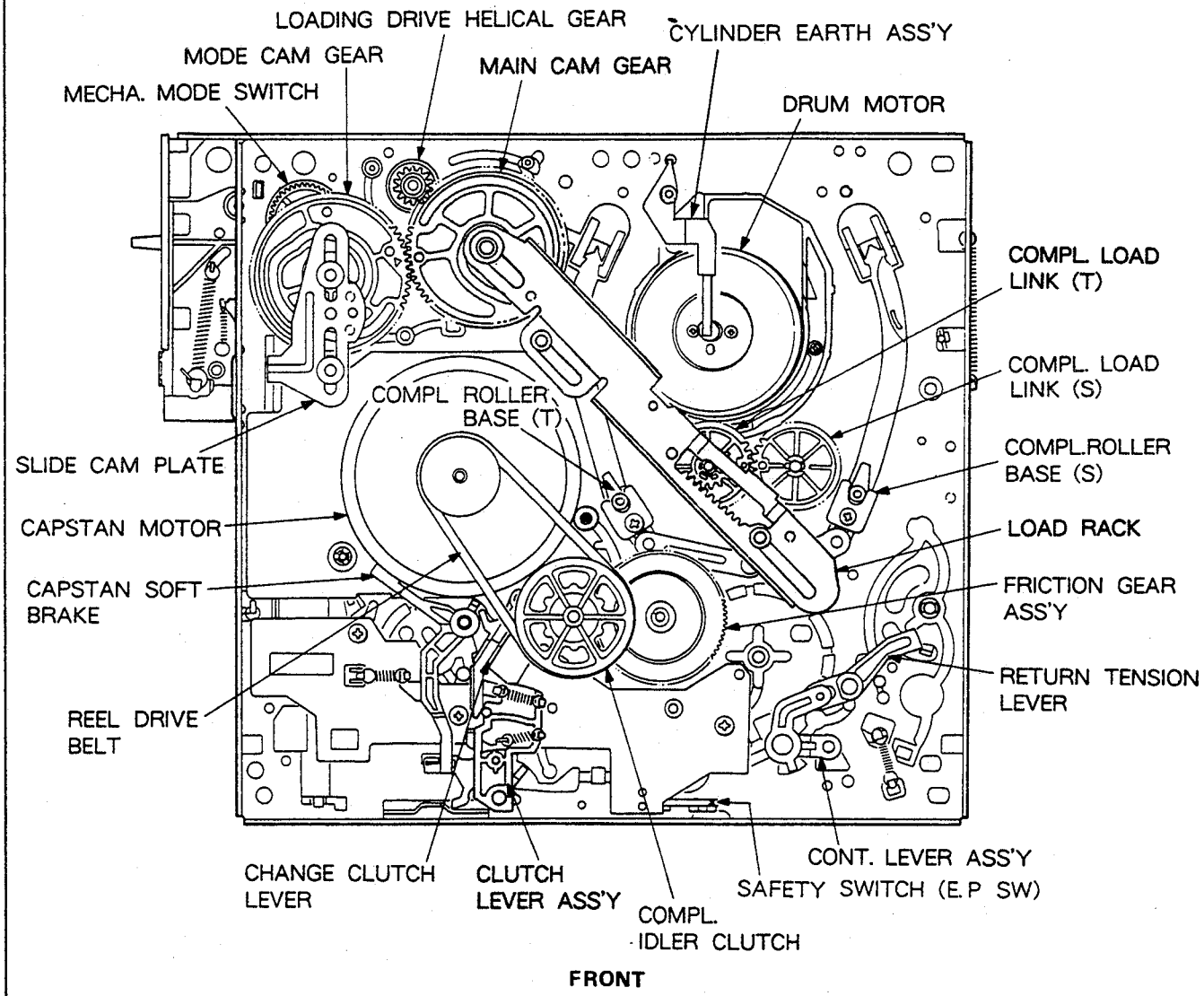


Fig. 2-2. Bottom View of Mechanism (Initial mode)

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVEs performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.
The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizedly being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 2-3 and Fig. 2-4, respectively. Also, the role of each cam used is described below.
On the GROOVE 3 side of MODE CAM GEAR have a small gear.

This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 2-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

MAIN CAM GEAR : CAM GROOVE 1.
Pinch roller pressing operation
CAM GROOVE 2.
Tape loading mechanical drive
MODE CAM GEAR : CAM GROOVE 3.
Brake and clutch selecting operation
CAM GROOVE 4.
Brake control and front unloading control

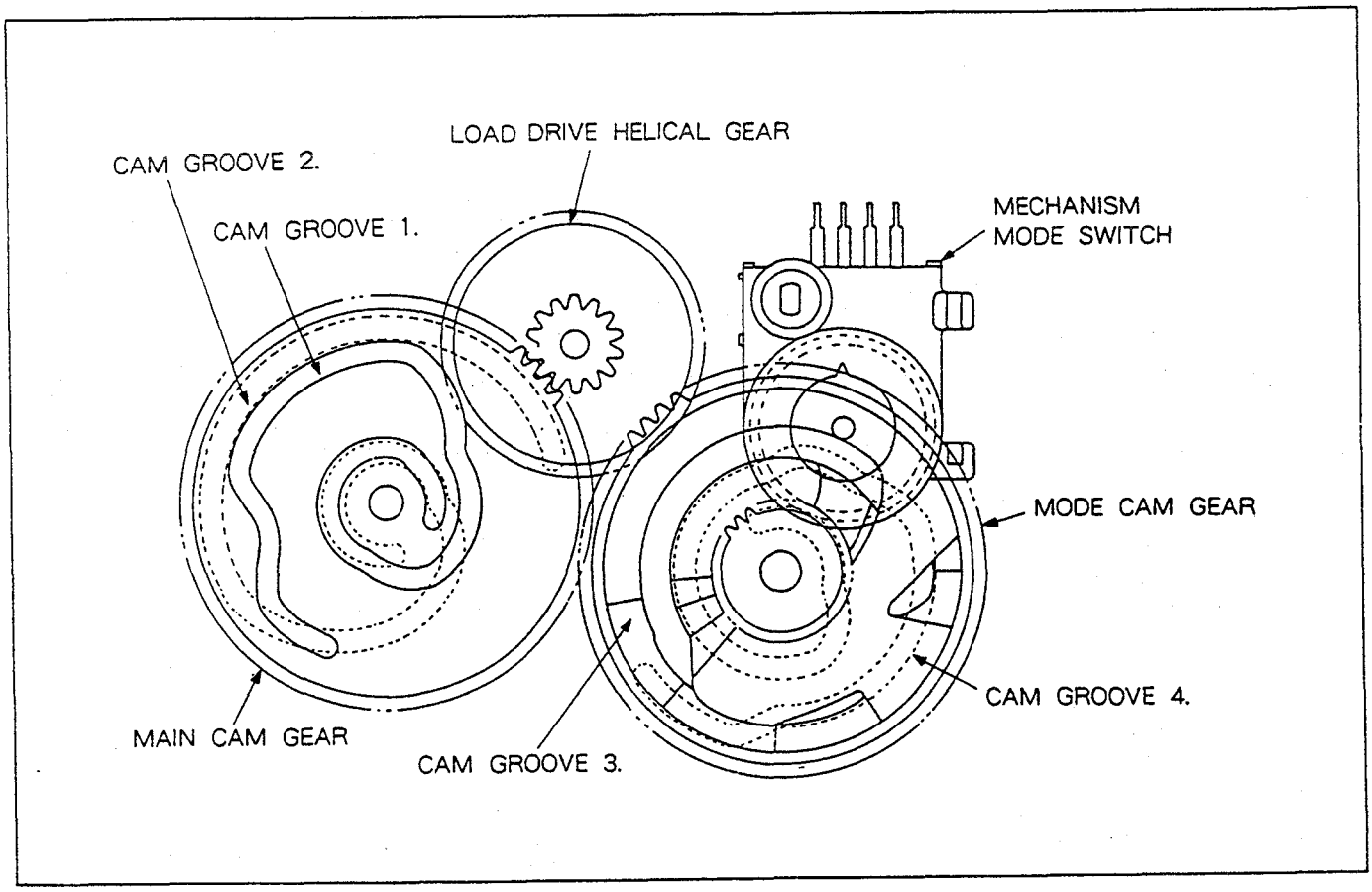


Fig. 2-3 PLAN OF CAMS CONSTRUCTION

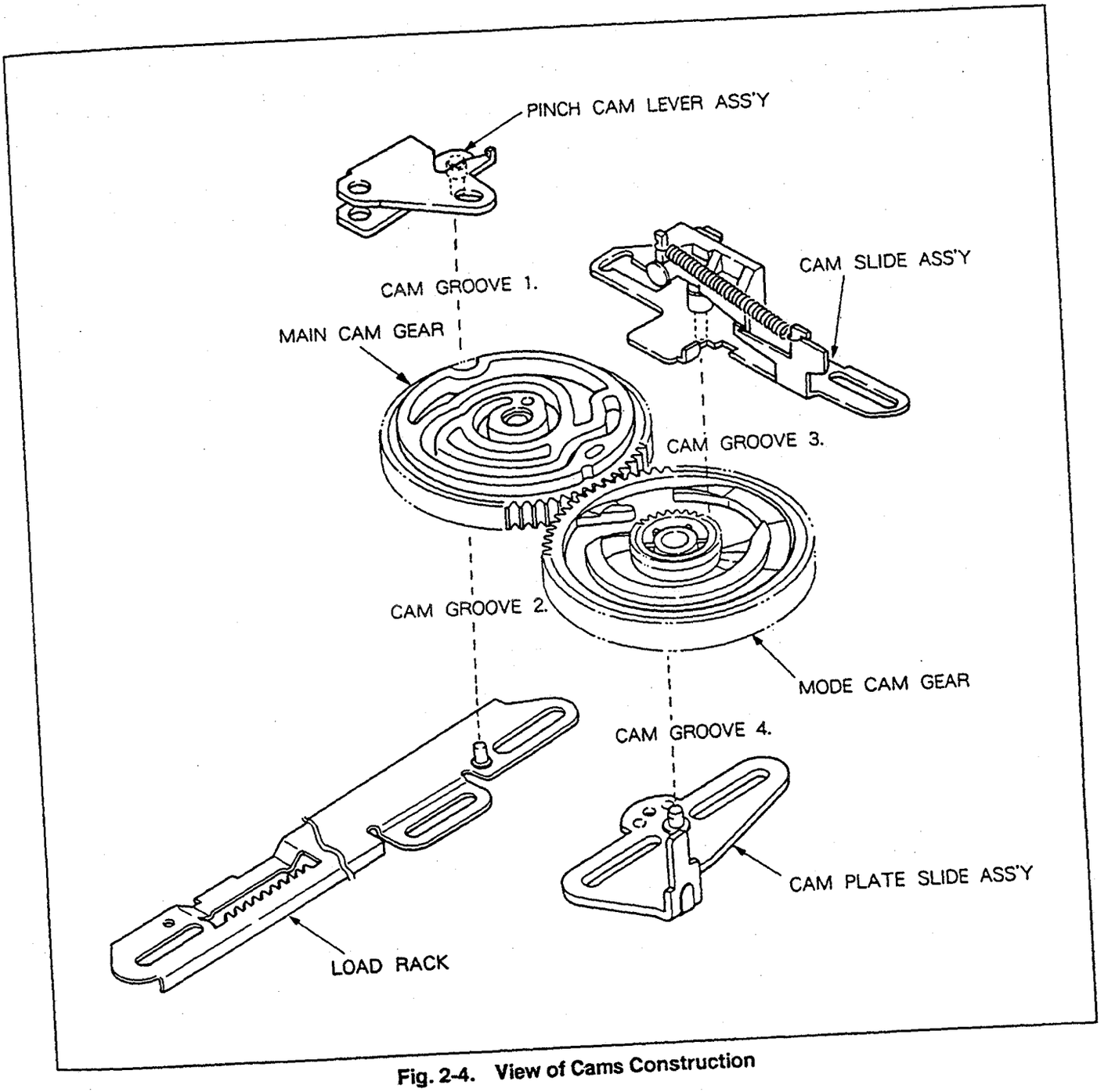


Fig. 2-4. View of Cams Construction

2-2-1. Tape Loading Mechanism

The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization. (Fig. 2-5)

The process from tape pull-out upon loading to contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.

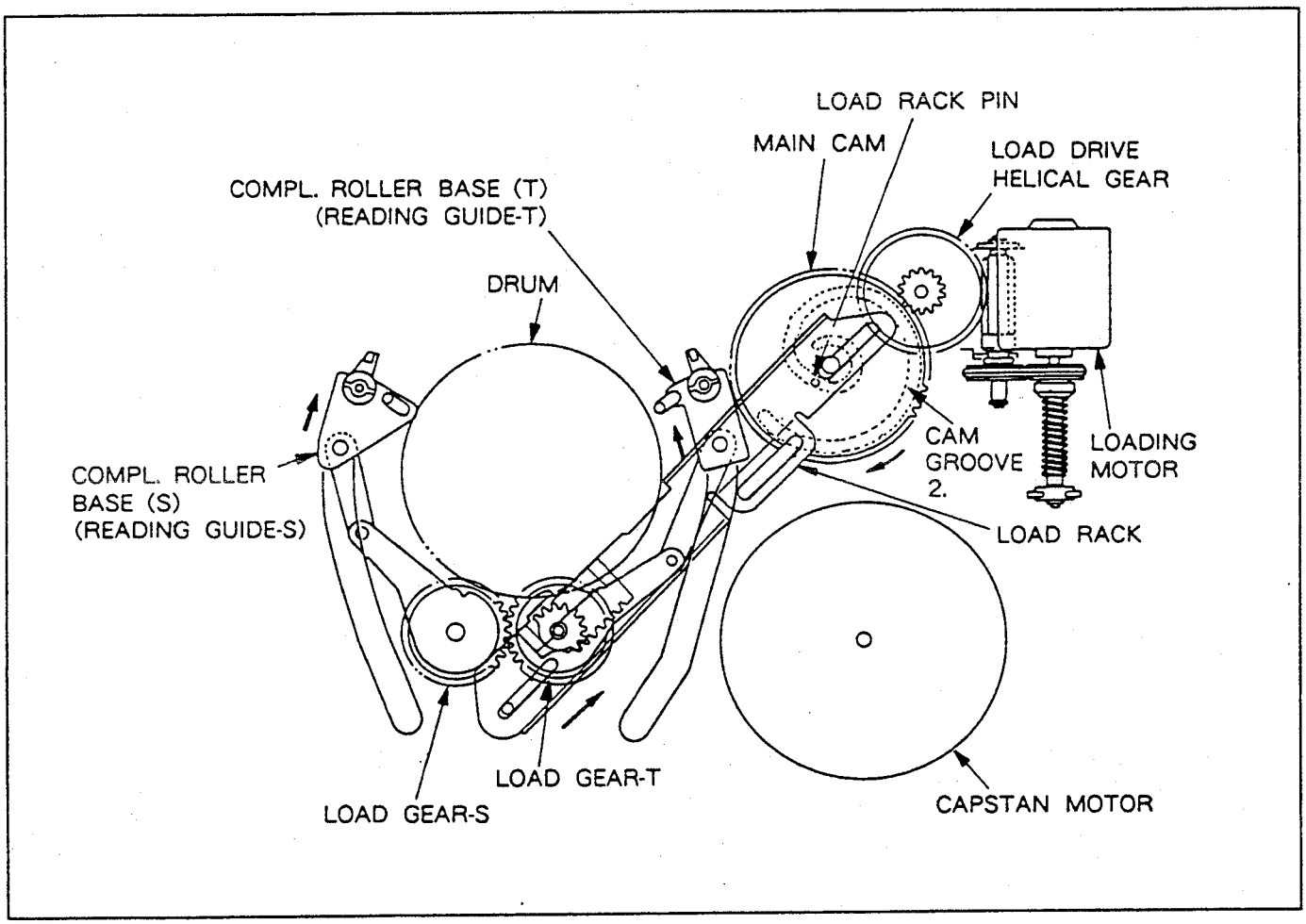


Fig. 2-5. Construction of Tape Loading Mechanism

2-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 2-6)

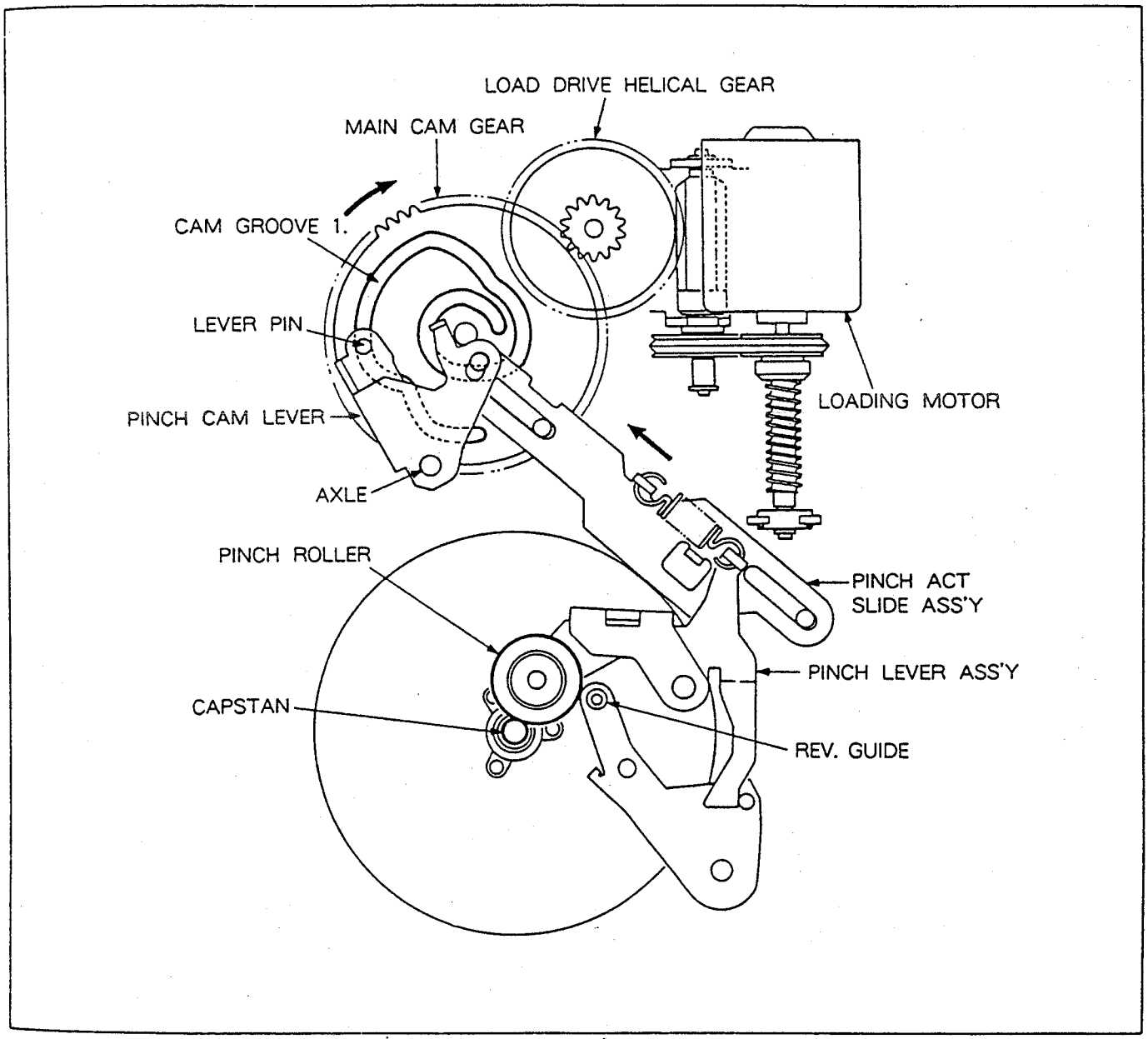


Fig. 2-6 CONSTRUCTION OF PINCH ROLLER MECHANISM

2-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 2-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

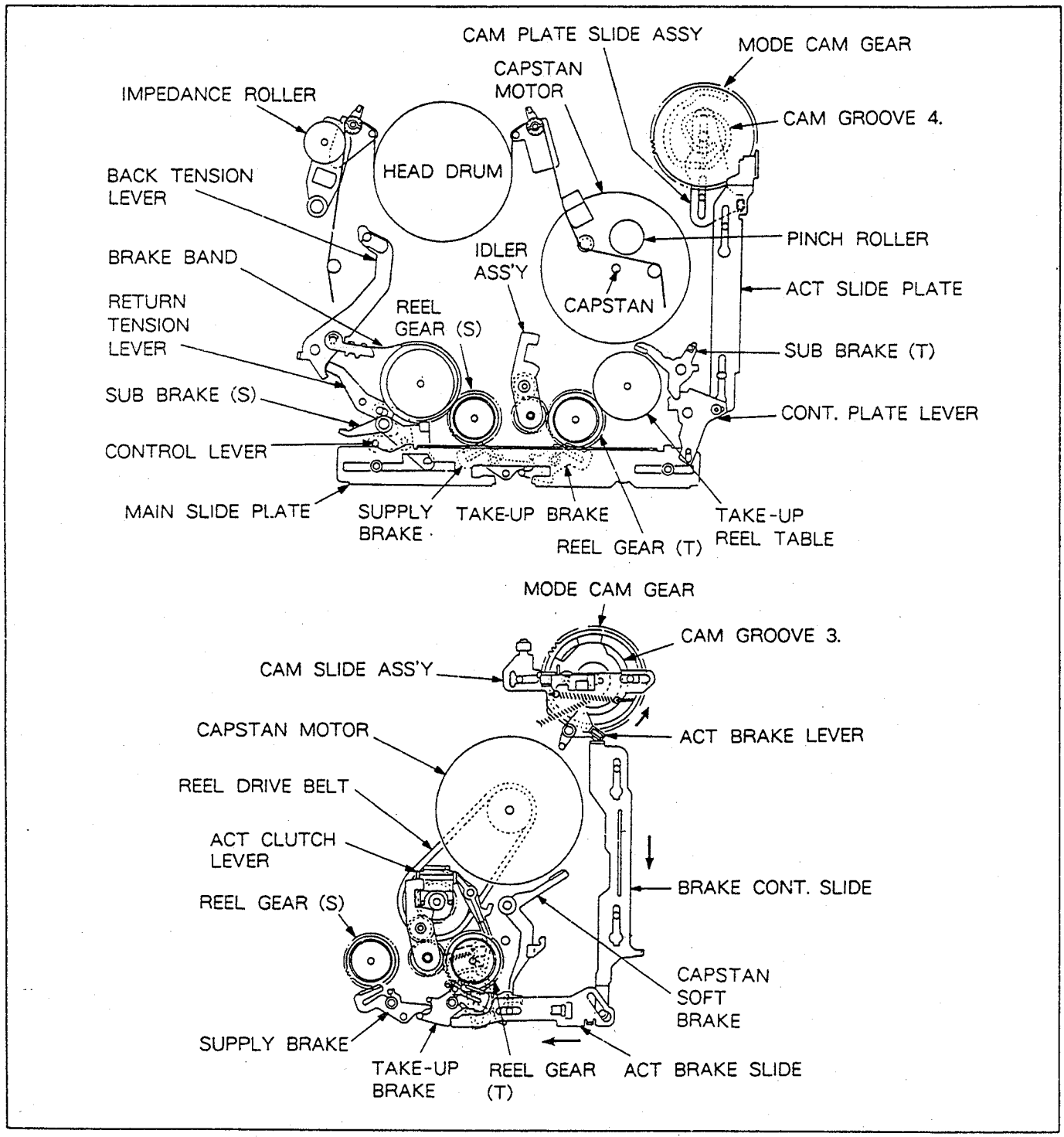


Fig. 2-7 CONSTRUCTION OF BRAKE CONTROL PLATE (AT REW/FF, STOP MODE)

2-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 2-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.

This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-90 mechanism.

To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.

These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

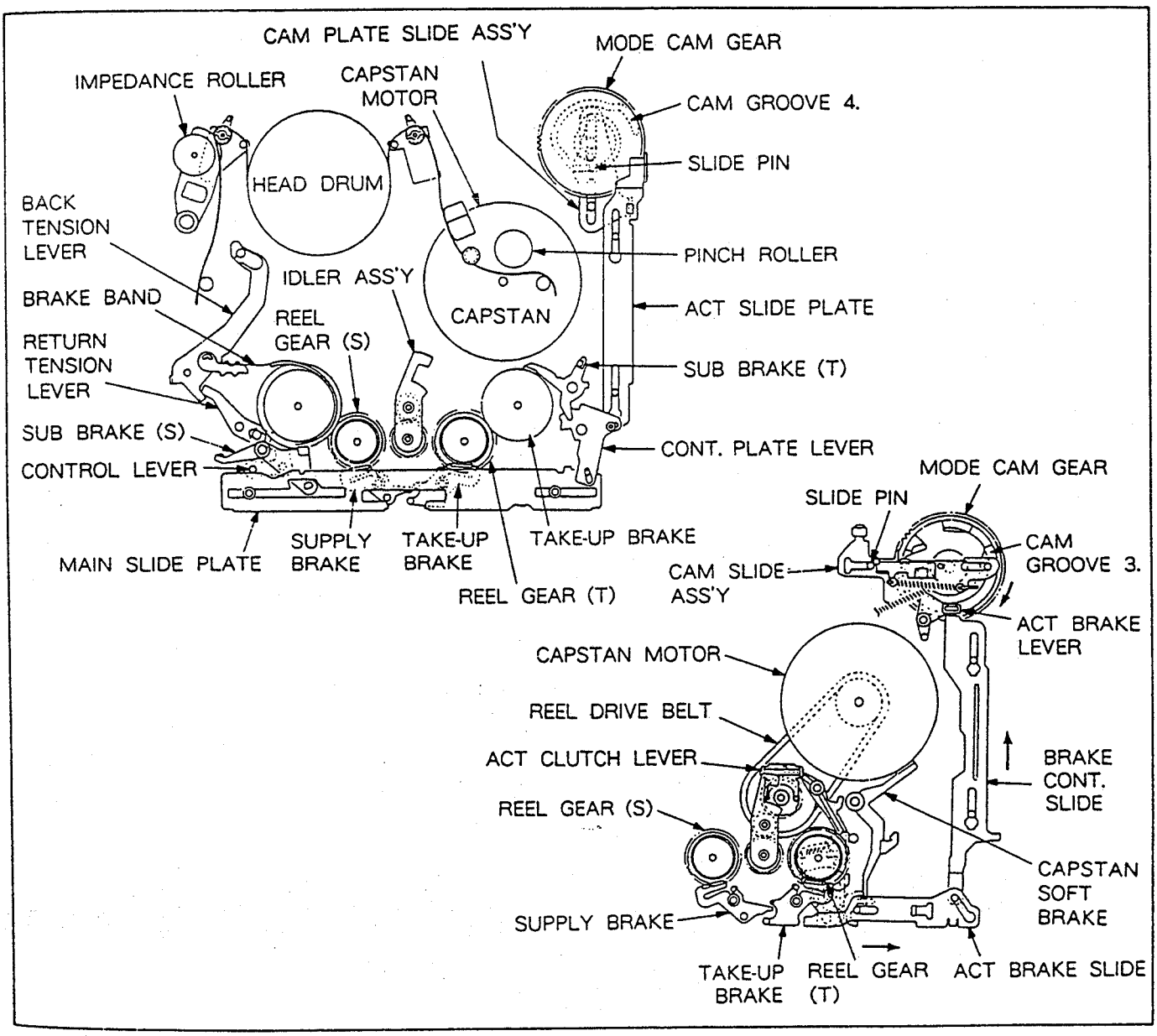


Fig. 2-8 CONSTRUCTION OF BRAKE CONTROL PLATE (AT BRAKE MODE)

2-2-5. Brake Lock Release Mechanism (FF/REW→STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 2-9 ⓐ, ⓑ and Fig. 2-10.
In the FF/REW mode (Fig. 2-9 ⓐ) mechanical elastic load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

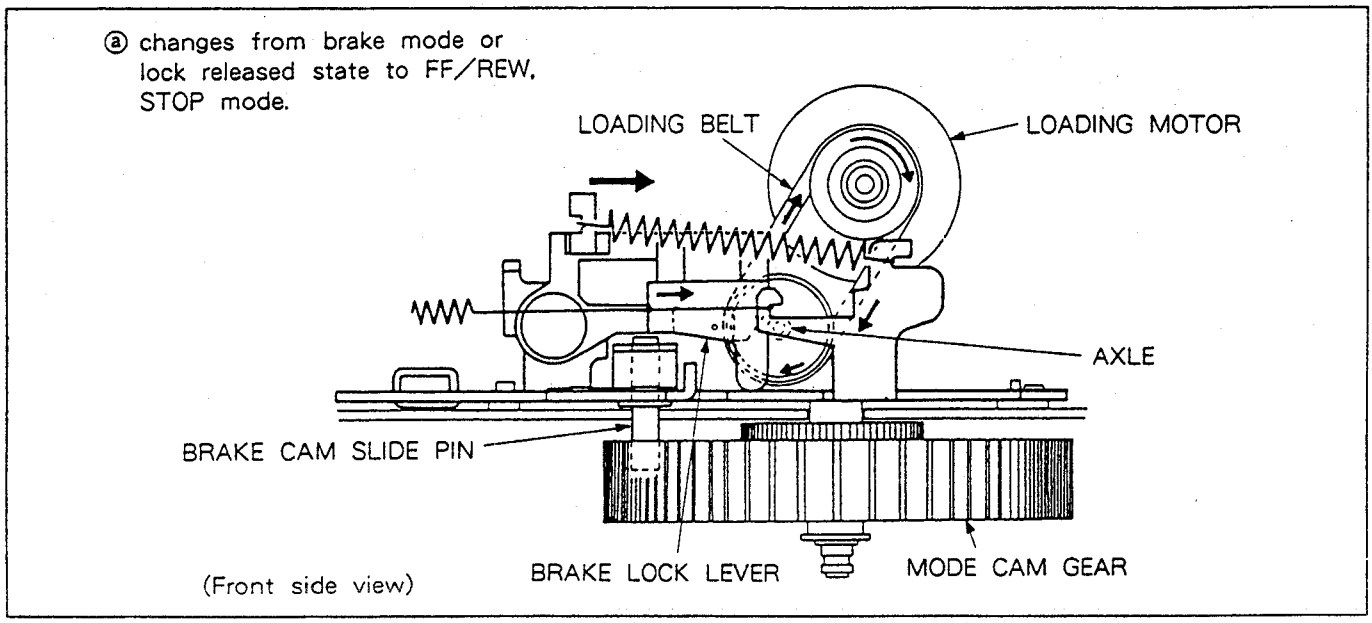


Fig. 2-9 ⓐ BRAKE LOCK & RELEASE MECHANISM

At the time of a shift to the STOP mode from the FF/REW (Fig. 2-9 ⓑ), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

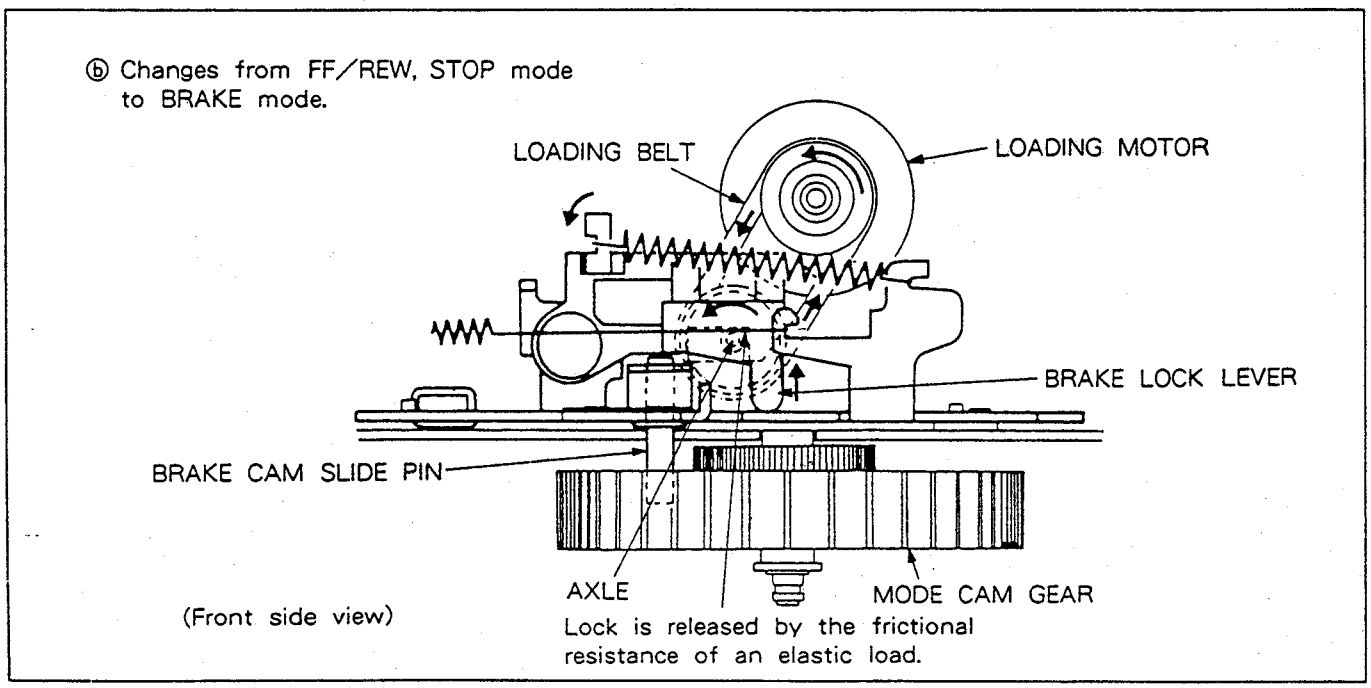

ⓑ Changes from FF/REW, STOP mode to BRAKE mode.
LOADING BELT
LOADING MOTOR
BRAKE LOCK LEVER
BRAKE CAM SLIDE PIN
AXLE
MODE CAM GEAR
(Front side view)
Lock is released by the frictional resistance of an elastic load.

Fig. 2-9 ⓑ BRAKE LOCK & RELEASE MECHANISM

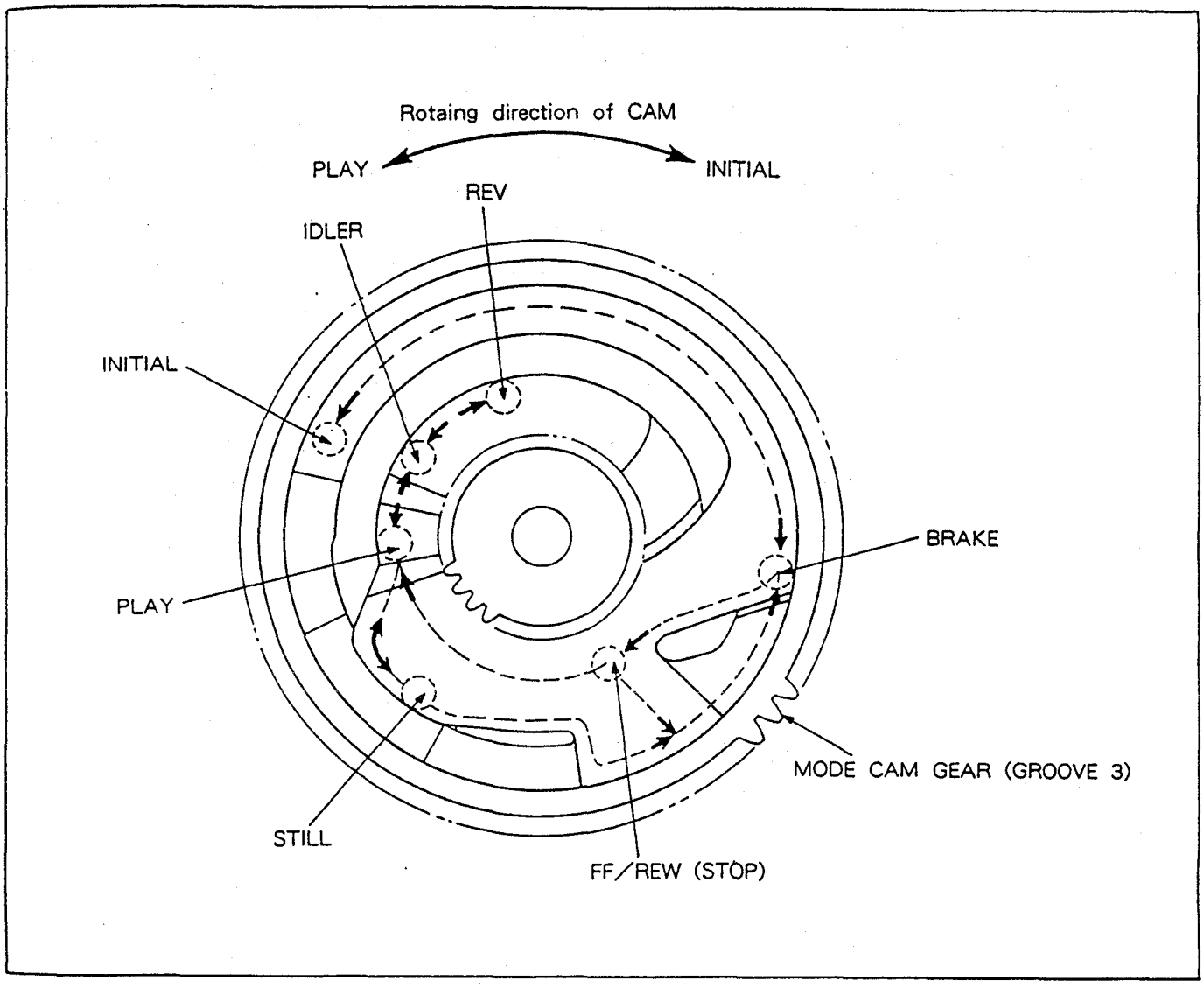


Fig. 2-10 POSITIONING OF BRAKE CAM SLIDE-PIN ON THE GROOVE 3 OF MODE CAM GEAR

2-3. REEL TABLE DRIVE

2-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch rolier are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 2-11 and Fig. 2-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

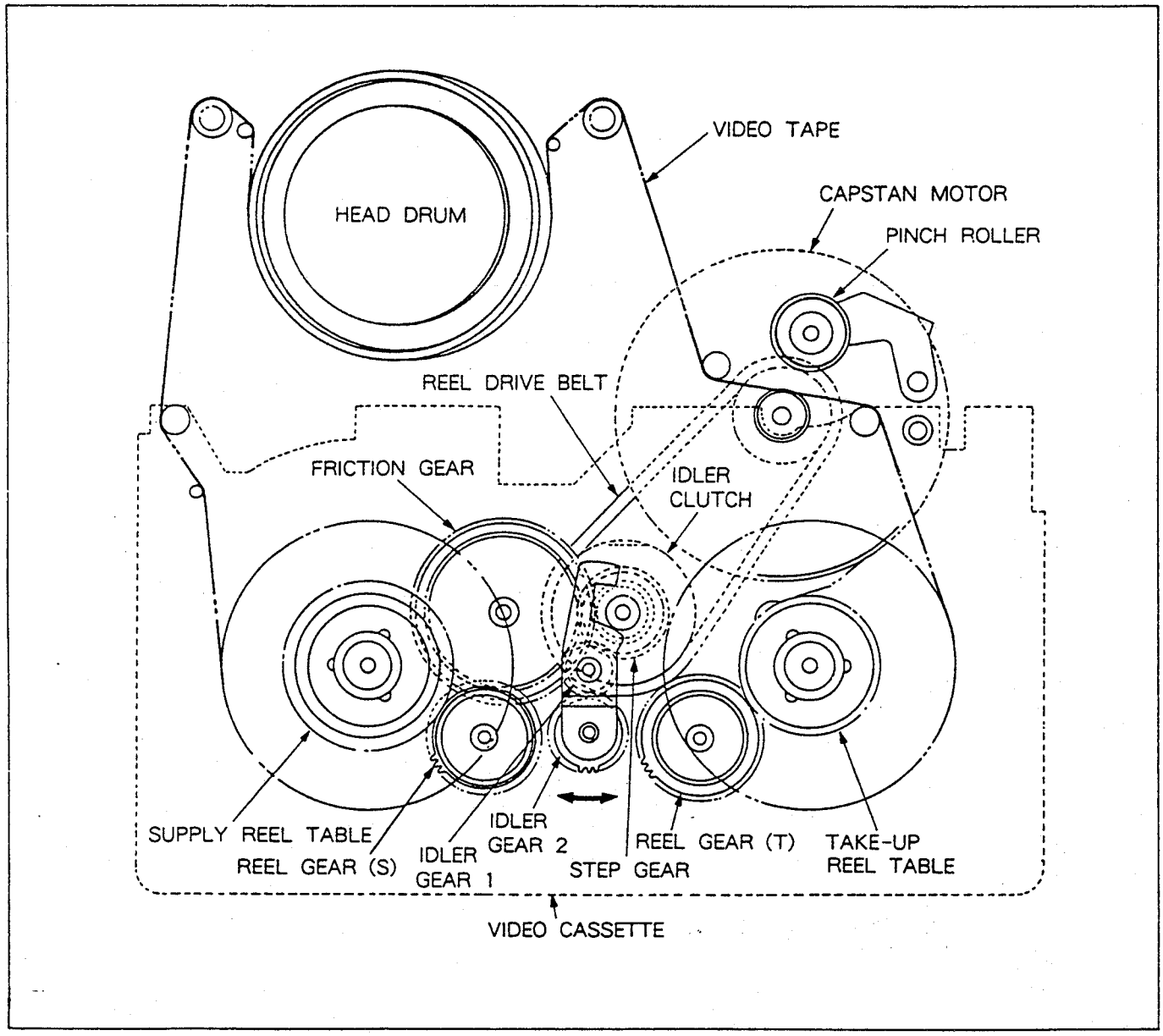
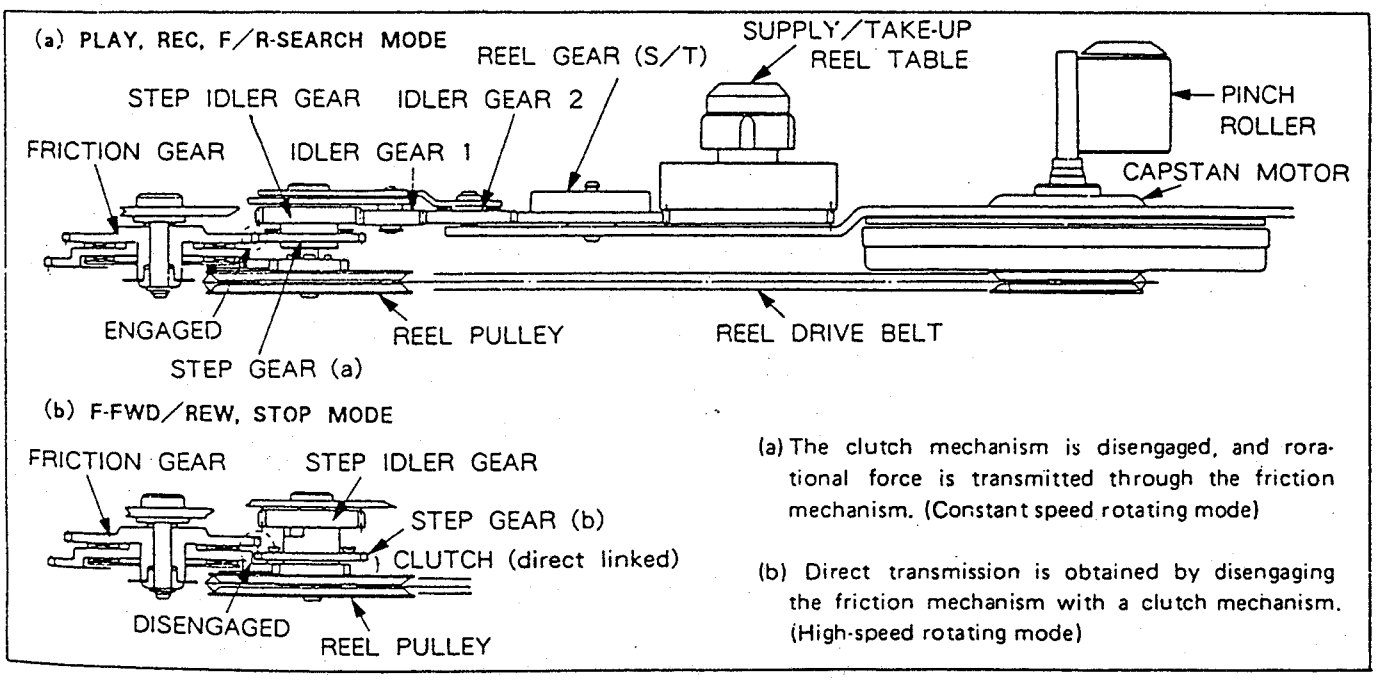


Fig. 2-11 REEL TABLE DRIVE

At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.
While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed.

Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, REC, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 2-12 ⓐ) On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 2-12 ⓑ). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.



(a) The clutch mechanism is disengaged, and rorational force is transmitted through the friction mechanism. (Constant speed rotating mode)

(b) Direct transmission is obtained by disengaging the friction mechanism with a clutch mechanism. (High-speed rotating mode)

Fig. 2-12 REEL TABLE DRIVE (SIDE VIEW)

2-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 2-13.

Fig. 2-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 2-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 2-13 ②.

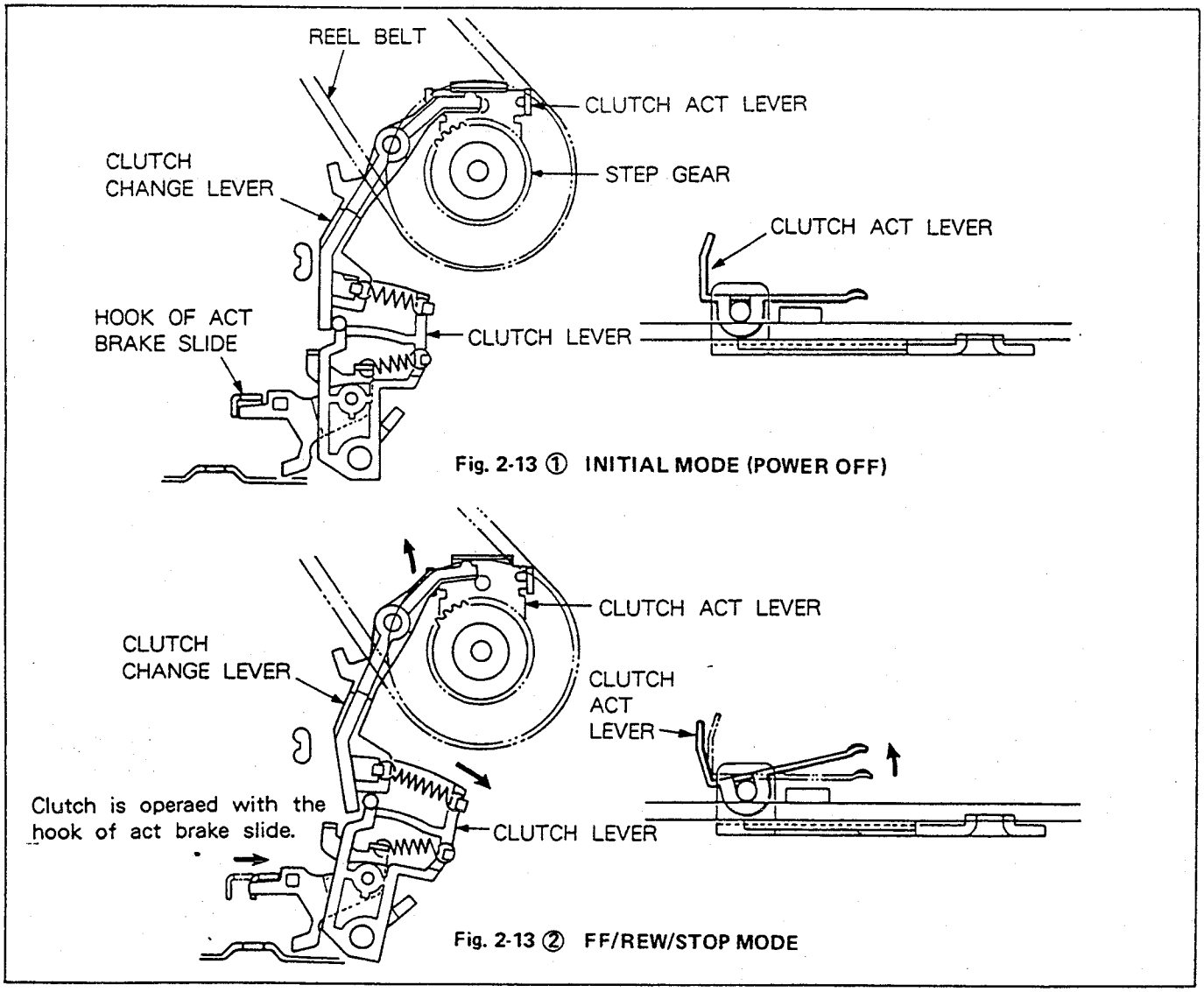


Fig. 2-13 ① INITIAL MODE (POWER OFF)

Fig. 2-13 ② FF/REW/STOP MODE

Fig. 2-13 ① – ③ REEL TABLE DRIVE CLUTCH LOCK AND RELEASE MECHANISM

Fig. 2-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.
In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY (REC) mode and SEARCH mode is made possible.

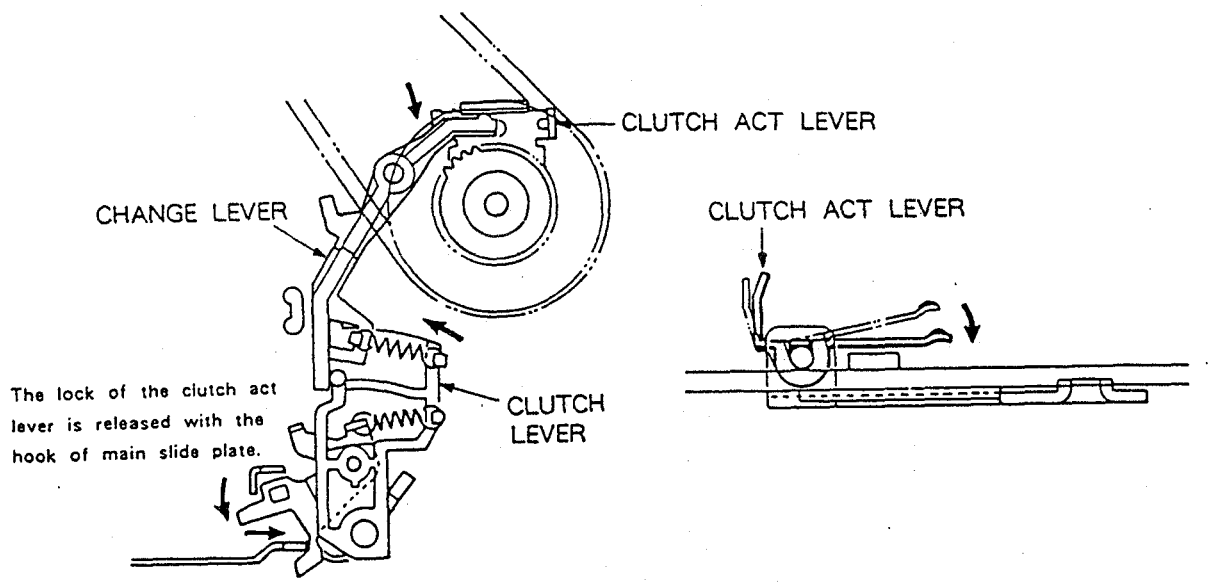

CLUTCH ACT LEVER
CHANGE LEVER
CLUTCH ACT LEVER
The lock of the clutch act lever is released with the hook of main slide plate.
CLUTCH LEVER

Fig. 2-13 ③ FF/REW/STOP MODE → STILL MODE → PLAY MODE

2-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-90 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 2-14 ⓐ/ⓑ, during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVEs of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

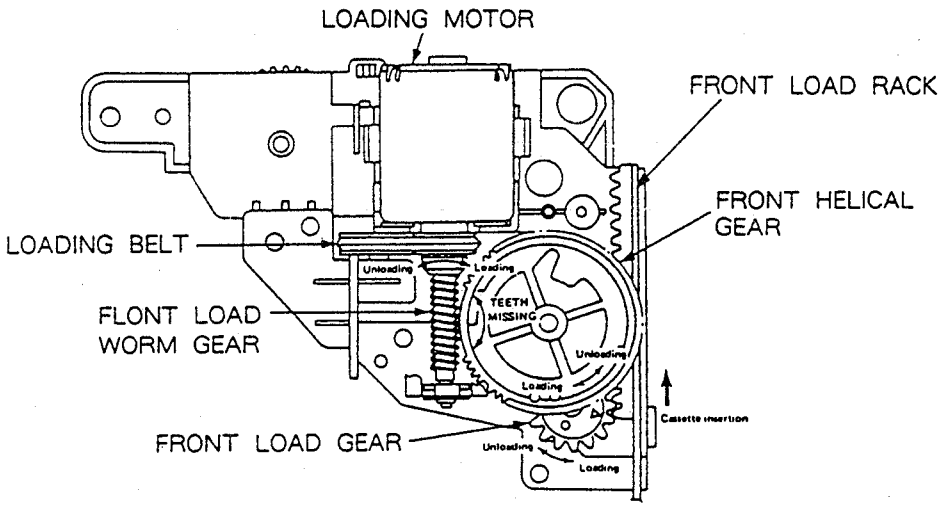


Fig. 2-14 ⓐ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE INSERTED POSITION)

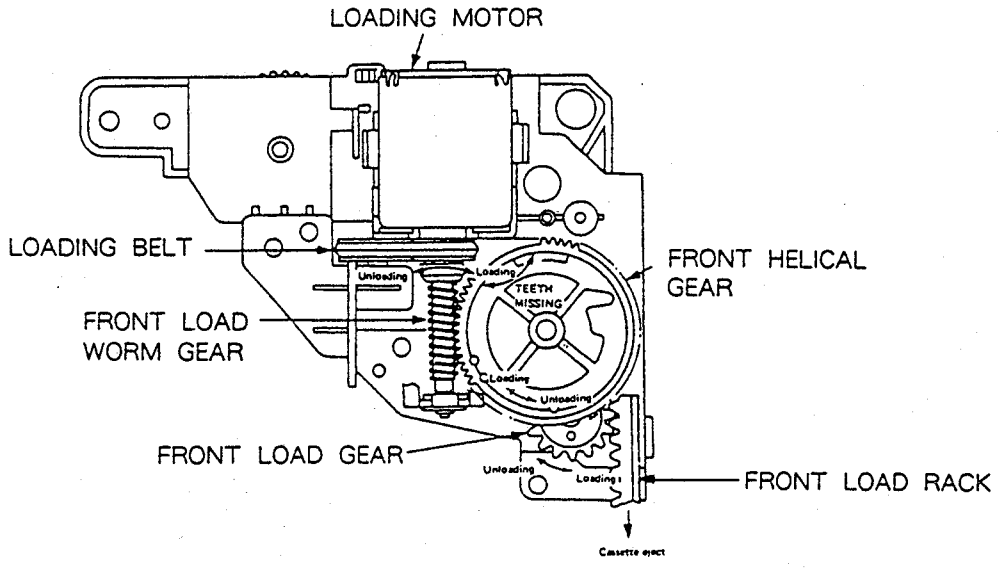


Fig. 2-14 ⓑ FRONT LOADING DRIVE SELECTION MECHANISM (CASSETTE EJECTED POSITION)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 2-14 ⓑ, the FL START SWITCH shown in Fig. 2-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 2-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ⓐ of Fig. 2-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

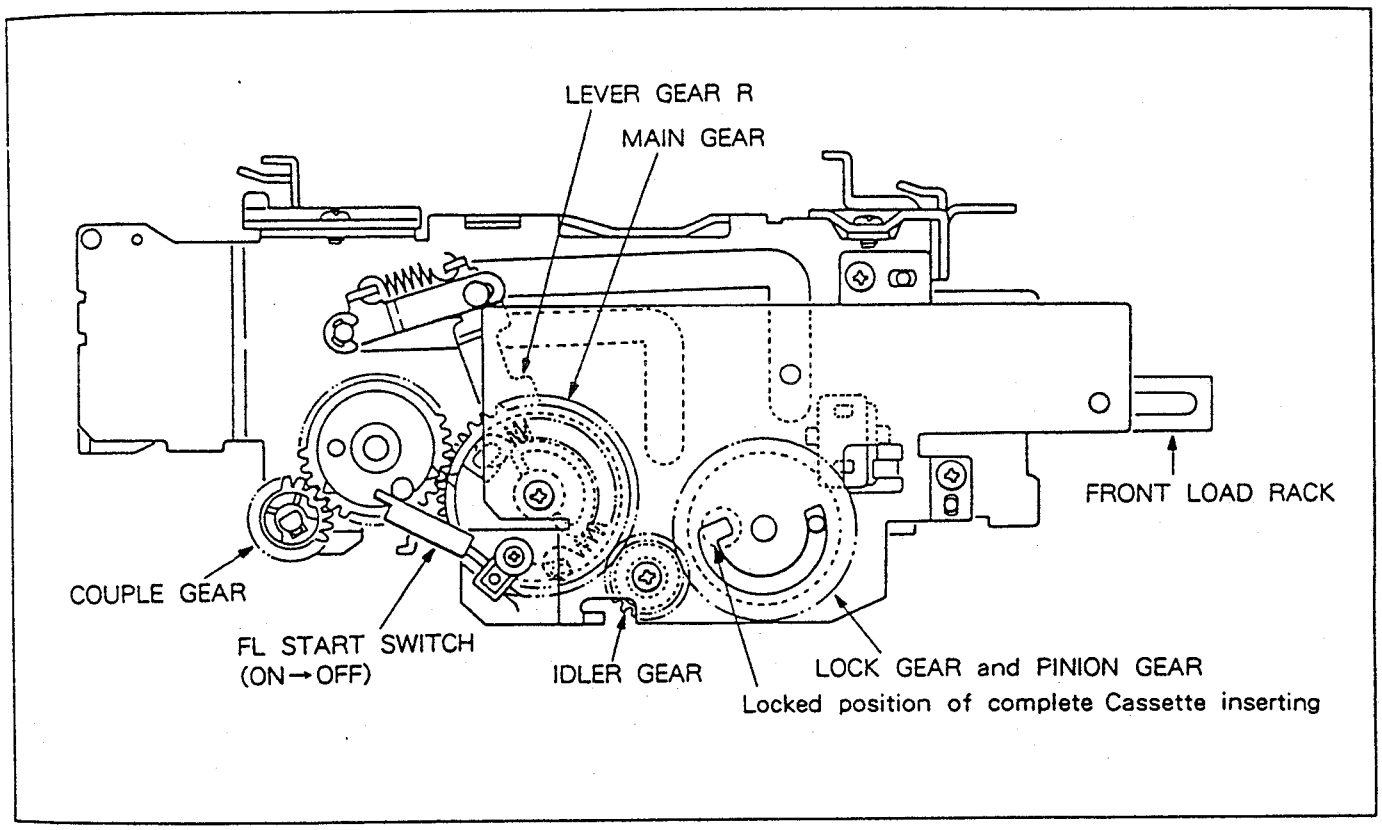


Fig. 2-15 CASSETTE HOLDER MECHANISM (CASSETTE INSERTING OPERATION)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 2-16.

When ejecting the cassette from the inserted state shown in Fig. 2-14 ⓐ, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 2-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 2-14 ⓐ) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

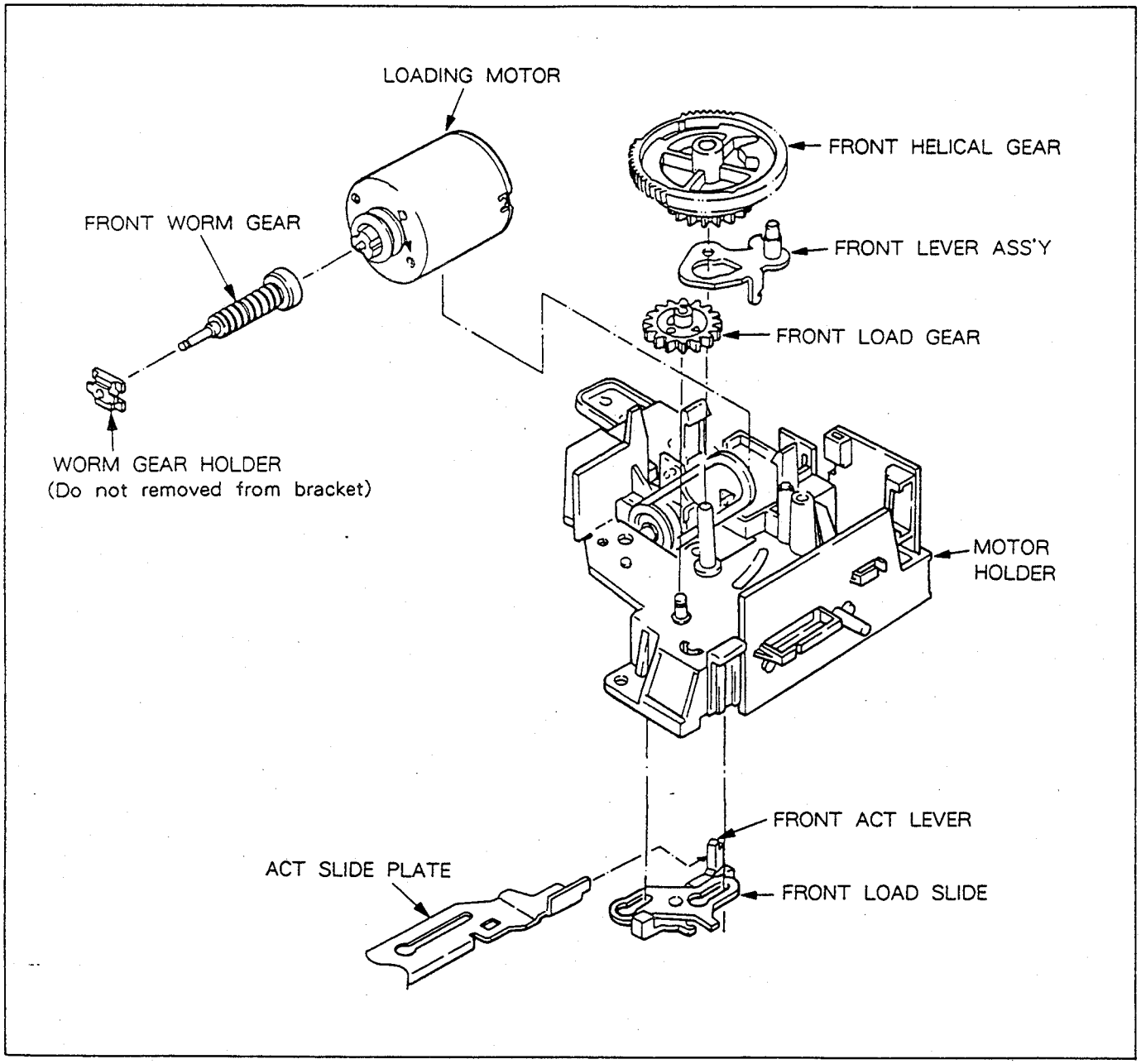


Fig. 2-16 FRONT LOADING DRIVE SELECTION MECHANISM

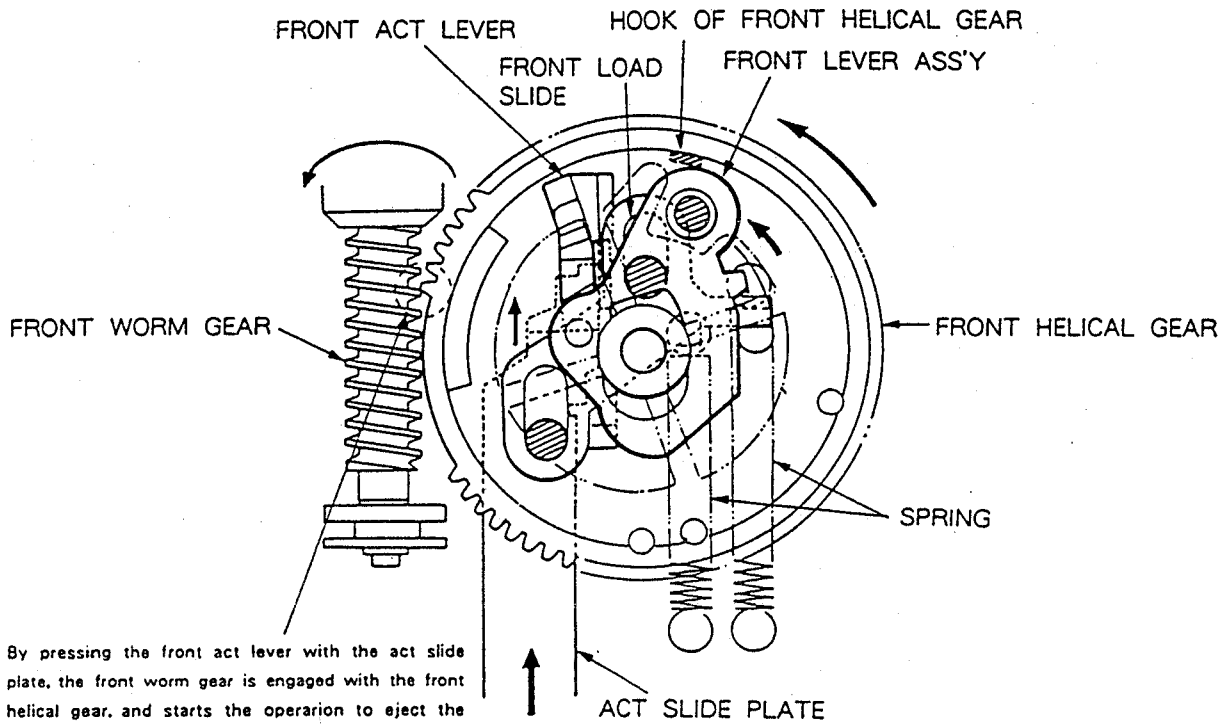

FRONT ACT LEVER
HOOK OF FRONT HELICAL GEAR
FRONT LOAD SLIDE
FRONT LEVER ASS'Y
FRONT WORM GEAR
FRONT HELICAL GEAR
SPRING
ACT SLIDE PLATE
By pressing the front act lever with the act slide plate, the front worm gear is engaged with the front helical gear, and starts the operarion to eject the cassette.

Fig. 2-17 CASSETTE EJECTION START OPERATION (See through top view)

2-5. CASSETTE HOLDER MECHANISM

2-5-1. Components

The exploded view of the cassette holder mechanism is shown in Fig. 2-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.

The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.

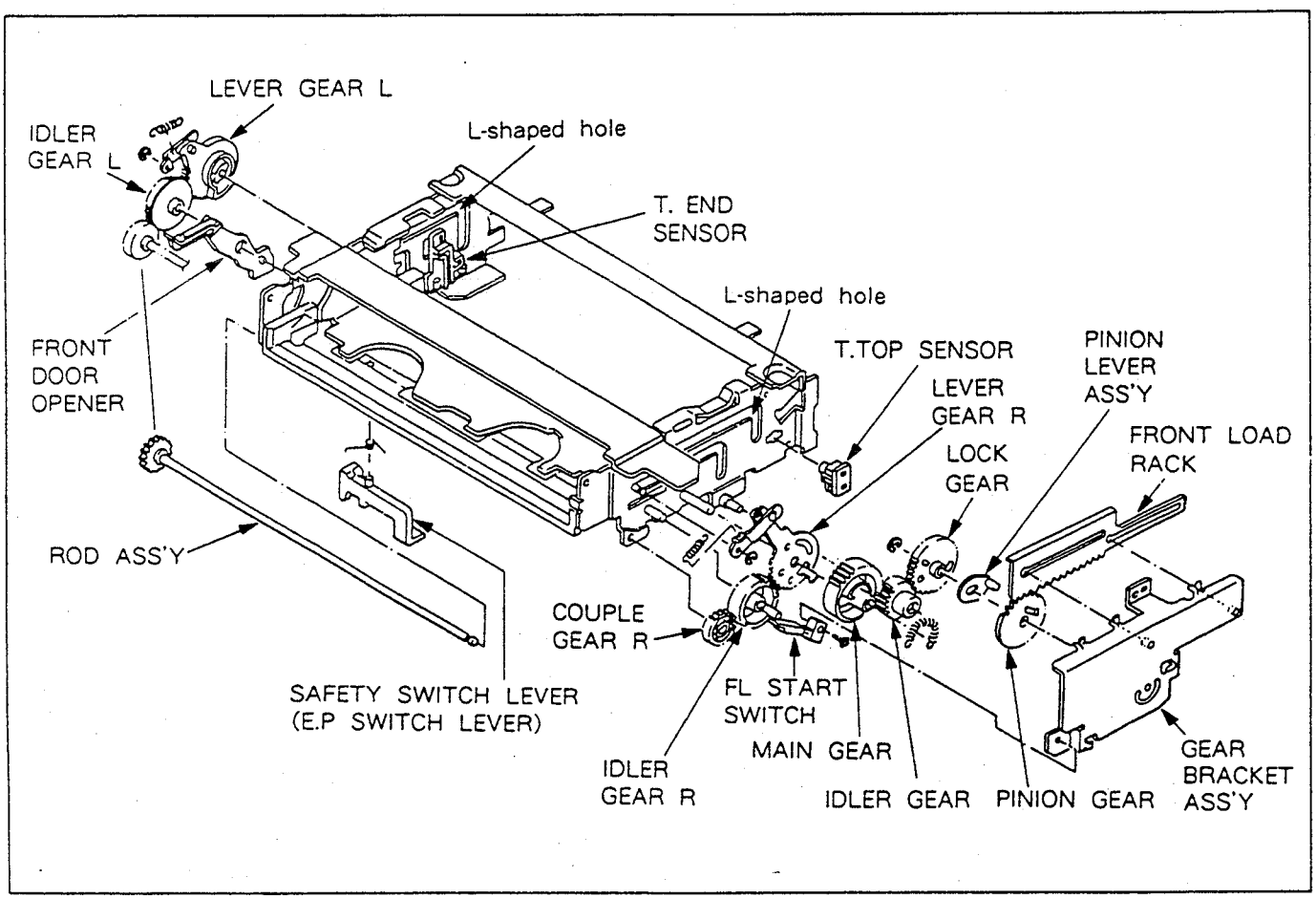


Fig. 2-18 EXPLODED VIEW OF THE CASSETTE HOLDER MECHANISM

2-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 2-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 2-19. A description of the operation is made below along with Fig. 2-19.

To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

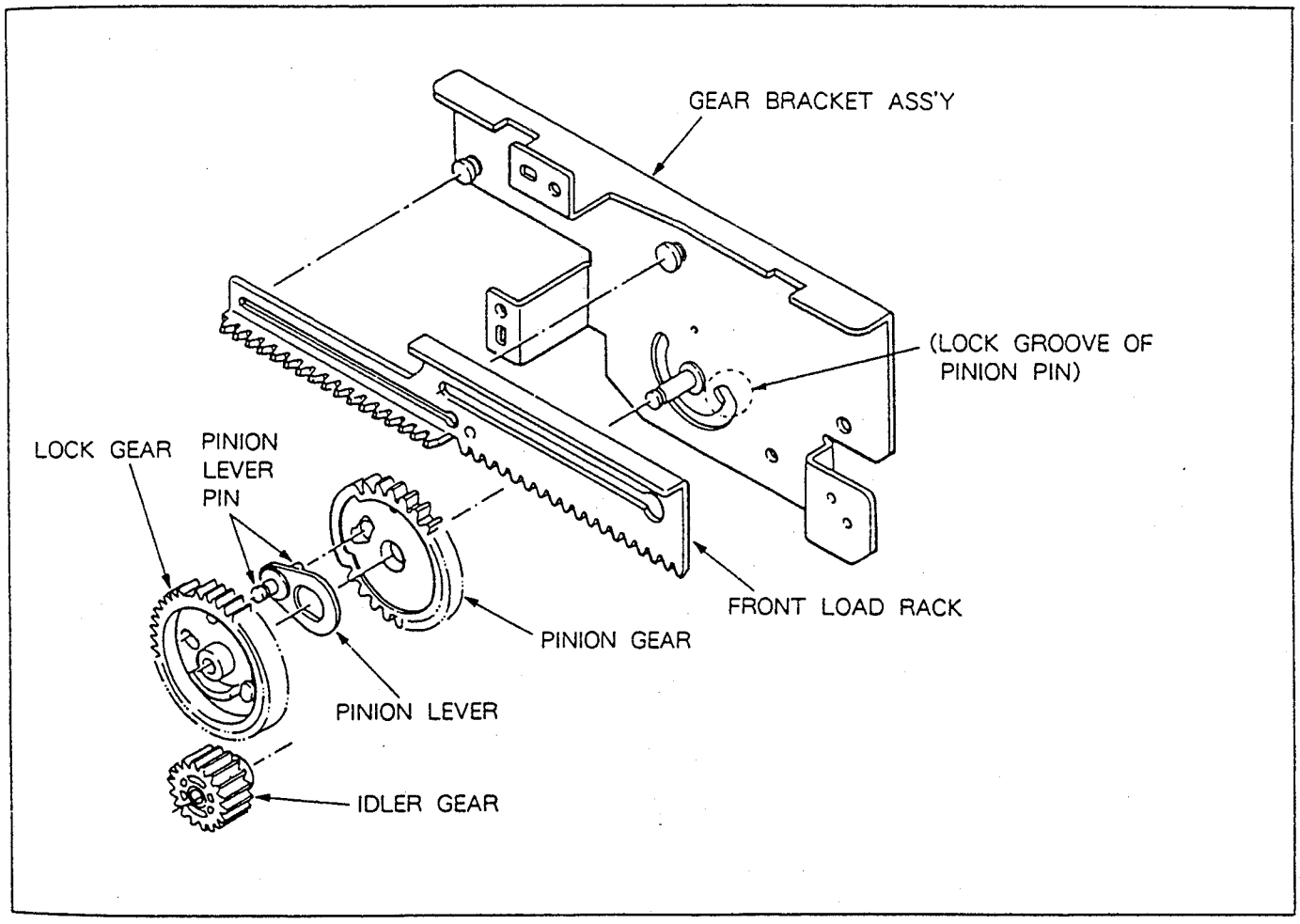


Fig. 2-19 RACK LOADING MECHANISM OF CASSETTE HOLDER

3. MECHANISM CONTROL

3-1. MODE ARRANGEMENT

This mechanism is arranged in such a mode layout as shown in Table. 3-1 and as described in section 2-1. The mode sensing switch described below is used for control of these modes.

3-2. MODE DETECTION SWITCH

For mode detecting one leaf switch (FL START SWITCH and one rotary switch (MECHANISM MODE SWITCH) are used in combination.

Mechanism Mode	Mechanism Mode Switch 3	2	1	HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
EJECT	–	–	–		Eject position	Detected by FL start switch	EJECT
					Front loading/Unloading	← Cassette insertion through STOP or PLAY mode STOP from EJECT →	
SHORT REW	1	1	0		Take up operation in the tape end position	← Pre-rolling after detecting tape end with tape end sensor.	Low side of ⑤ Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power ON↔OFF when the cassette is inserted completely. OFF	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	From PLAY to STOP From FF/REW to STOP	
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)	ON	STOP. FF/REW
STILL	0	1	1	③	The positions of STILL. SLOW or F-ADV.	From SLOW to STOP (or STILL) From FF to F-SEARCH From F-SEARCH to FF PLAY↔STILL	STILL. SLOW. F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode		PLAY. REC. F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PLAY↔R-SEARCH From REW to R-SEARCH From R-SEARCH to REW	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Table 3-1

(1) Switch component
The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 3-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch.
In the P88 and P89 mechanisms, incidentally, short REW position is detected by the FL END SW, but in the P90 mechanism, the FL END SWITCH is not required due to a change in the internal structure of the MECHANISM MODE SWITCH.

(2) Mechanism mode switch
The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.
The MECHANISM MODE SWITCH is not interchangeable with the hither to available black switch due to a change in its internal structure. Be sure therefore to use a blue switch.

3-3. CONSIDERATION TO FULL LOADING

① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.

② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.

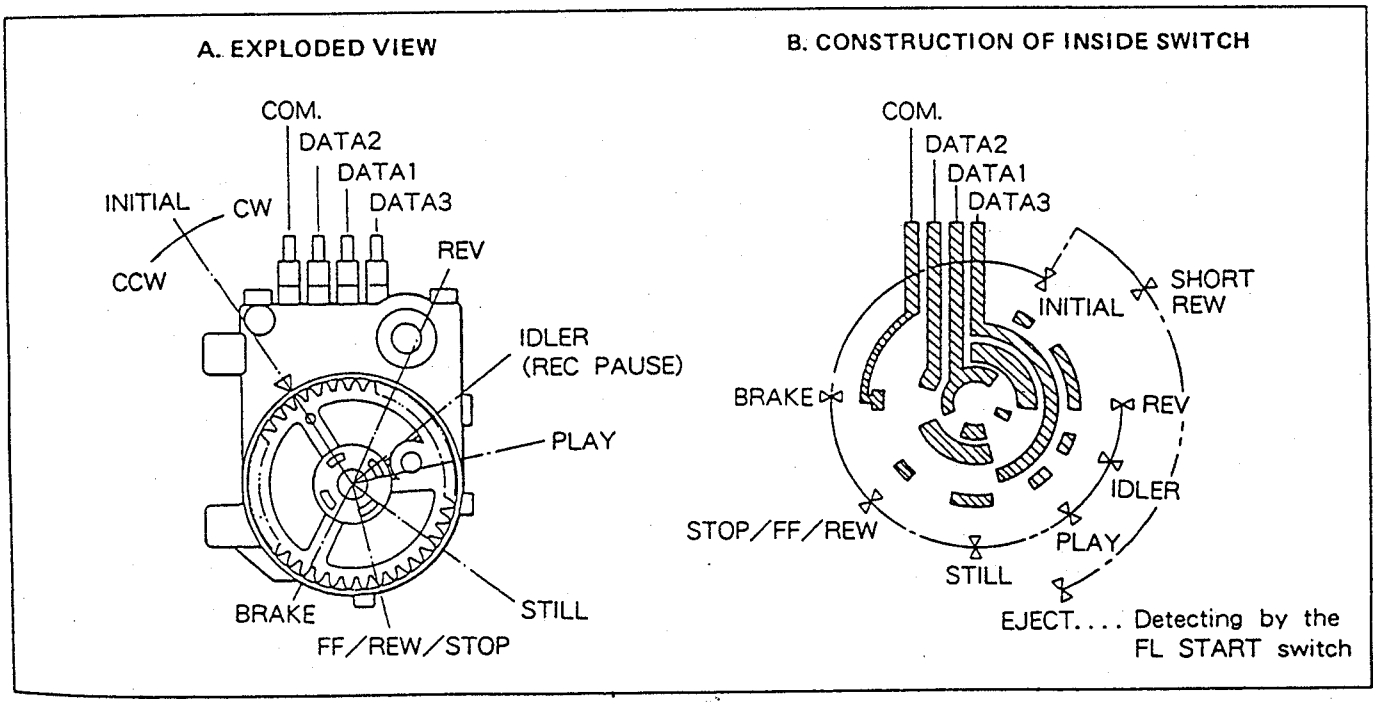


Fig. 3-1 MECHANISM MODE SWITCH (ROTARY SWITCH)

4. MECHANISM MAINTENANCE AND CHECKING

4-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

4-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication

Part \ Usage Time (hours)		500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape Guide System	Tape running surfaces	○	○	○	○	○	○	○	○	○	○	
	ACE head	○	○	○	○	○	○	○	○	○	○	
	Drum (cylinder)	○	○	○	○	○	○	○	○	○	○	Head life depends heavily on operating conditions.
Drive System	Loading belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Reel drive belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Intermediate gear, pulley axles		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Performance Check	Back tension torque		◎		◎		◎		◎		◎	50 ± 10gcm.
	Brake system		◎		◎		◎		◎		◎	
	FF, REV, PLAY torque		◎		◎		◎		◎		◎	FF : 600 gcm and over REW : 750 gcm and over REV : 150 to 240 gcm PLAY: 80 to 140 gcm

Note: The back tension torque is the value that has been measured by the cassette torque meter (Back tension, REW: VHT-063S) (REV: VHT-404S).
The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque gauge.
FF and REW are values 2 seconds after starting.
Torque Tape: VHT-063S (J-6082-066-A)
VHT-404S (J-6082-067-A)

4-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 4-1-1.)

1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
3) Clean the tape path surface of the cylinder in the same way.

Note : Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head ; it may be damaged.

② Cleaning of the Tape Guide System (See Fig. 4-1-2.)

1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note : Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

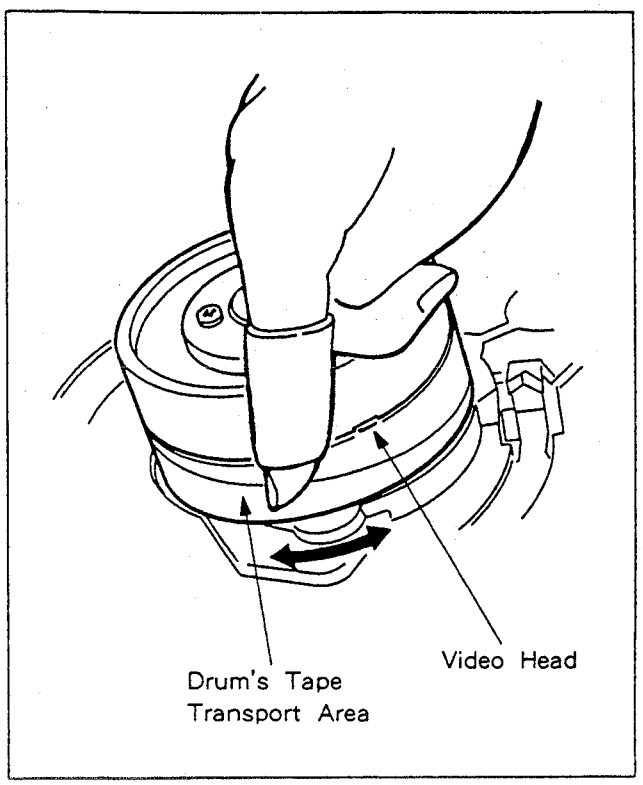


Fig. 4-1-1.

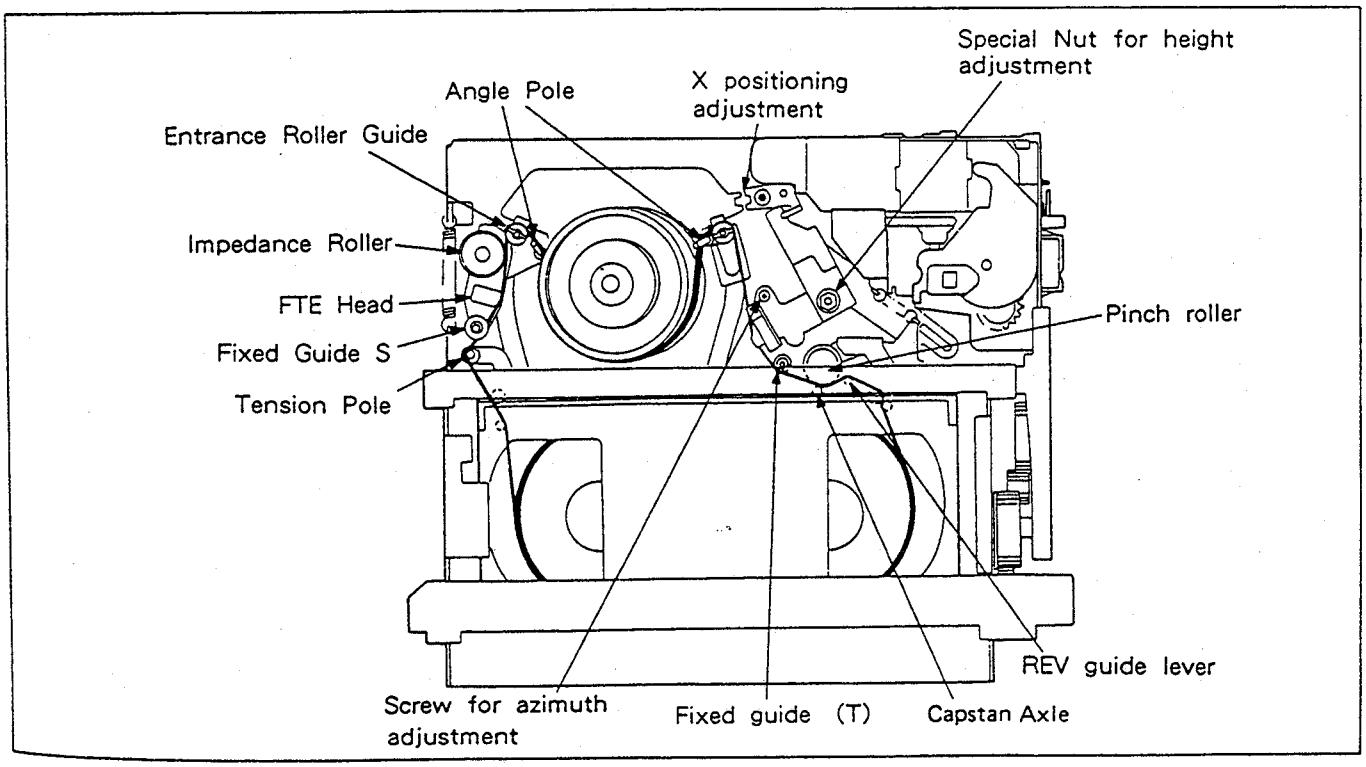
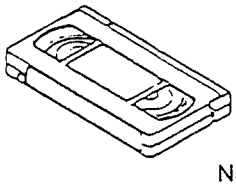


Fig. 4-1-2. Cleaning

4-1-3. Service Jigs

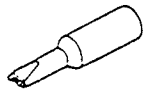
No.	Jig	Jig No.	Remarks
1	Alignment tape (PAL)	H-7099-052-H	PAL-NORMAL
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel take-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	REV guide lever removing tool (VHJ-0073)	J-6090-007-A	For REV guide lever removal
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Master plane	H-7099-279-H	Reel table height
12	Reel disc height jig	H-7099-038-H	Reel table height
13	Mode selector relay board (VHJ-0103)	J-6090-049-A	Relay board for mode selector (22pin)
14	PAL torque cassette (VHT-063S) (PAL)	J-6082-066-A	For back tension torque
15	26-pin flexible flat cable (VHJ-0064)	J-6090-006-A	Spare cable for mode selector

H-7099-052-H



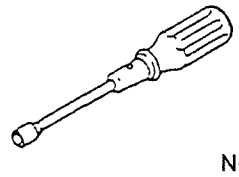
No. 1

J-6082-044-A (VHJ-0003)



No. 2

J-6082-045-A (VHJ-0048)



No. 3

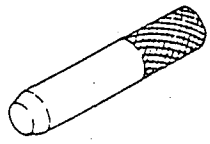
H-7099-039-H

No. 4

H-7099-035-H

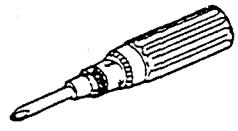
No. 5

J-6090-007-A (VHJ-0073)



No. 6

J-6082-047-A (VHJ-0014)

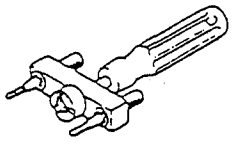


No. 7

J-6082-048-A (VHJ-0045)

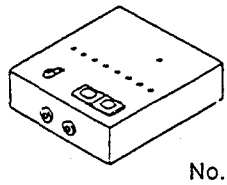
No. 8

J-6082-049-A (VHJ-0041)



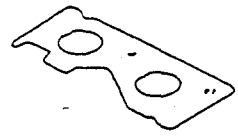
No. 9

J-6082-050-A (VHJ-0050)



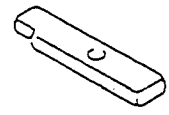
No. 10

H-7099-279-H



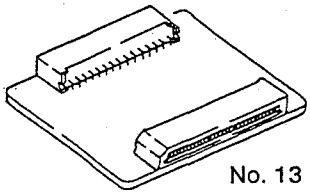
No. 11

H-7099-038-H



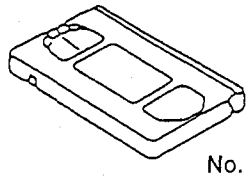
No. 12

J-6090-049-A (VHJ-0103)



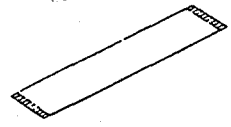
No. 13

J-6082-066-A



No. 14

J-6090-006-A (VHJ-0064)



No. 15

4-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 × 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT⇔REV mode changes.
Instead of the internal batteries, an external DC 6V power supply can also be used.

4-2-1. Part Names (See Fig. 4-2-1)

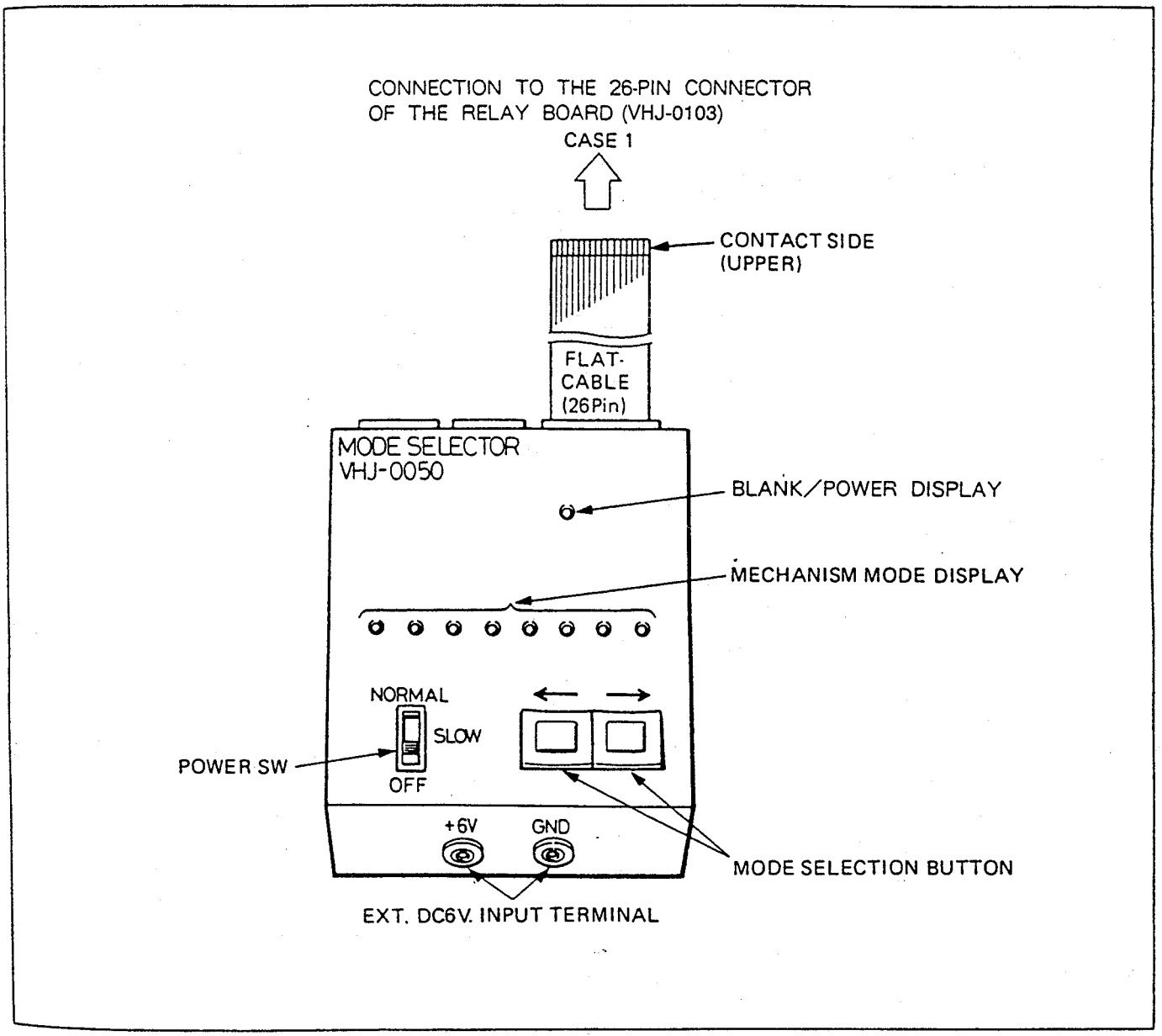


Fig. 4-2-1

4-2-2. Connection Method (See Fig. 4-2-2)

1) Remove the 22-pin flat cable extending from the COMPL MC-2 board connector (CN811) from the connector of the system control circuit board, and connect it to the 22-pin connector of the mode selector relay board (VHJ-0103).
2) Connect the 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) provided between the mode selector body and the 26-pin connector of the mode selector relay board (VHJ-0103).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting the flexible flat cable.

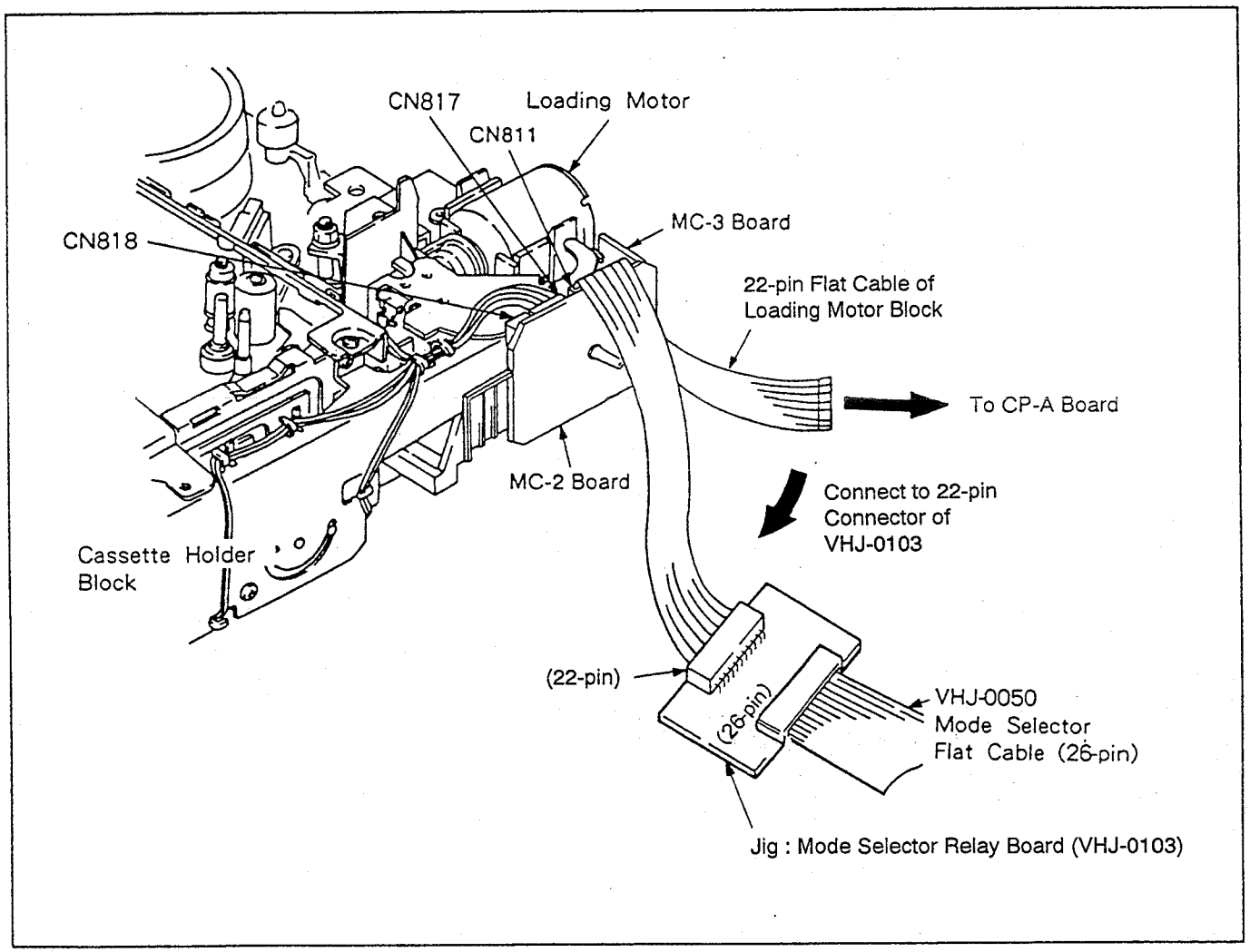


Fig. 4-2-2 Connection

4-2-3. Handling Method

1) Keep the right side (⇨) of the mode selector key pressed, and the mode will change in the following sequence : EJECT⇨INITIAL⇨BRAKE⇨ STOP/REW/FWD⇨STILL⇨PLAY⇨IDLER⇨REV.
2) When changing the mode in the REV···⇨EJECT direction, press the left side (⇦) of the mode selector key until the desired mode is indicated.
3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in.
   Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1 : The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2 : If the left side (⇦) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇨) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇨) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 4-5-5 of section 4-5-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during EJECT to INITIAL).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the left side (⇦) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3 : The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

5. MECHANISM DISMANTLING AND REASSEMBLING

5-1. MECHANISM MAIN UNIT (See Fig. 5-1-1.)

1. Removal

1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
5) Remove the two screws ⑥.
6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.
   Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note : Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
2) Tighten the two screws ⑥.
3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.

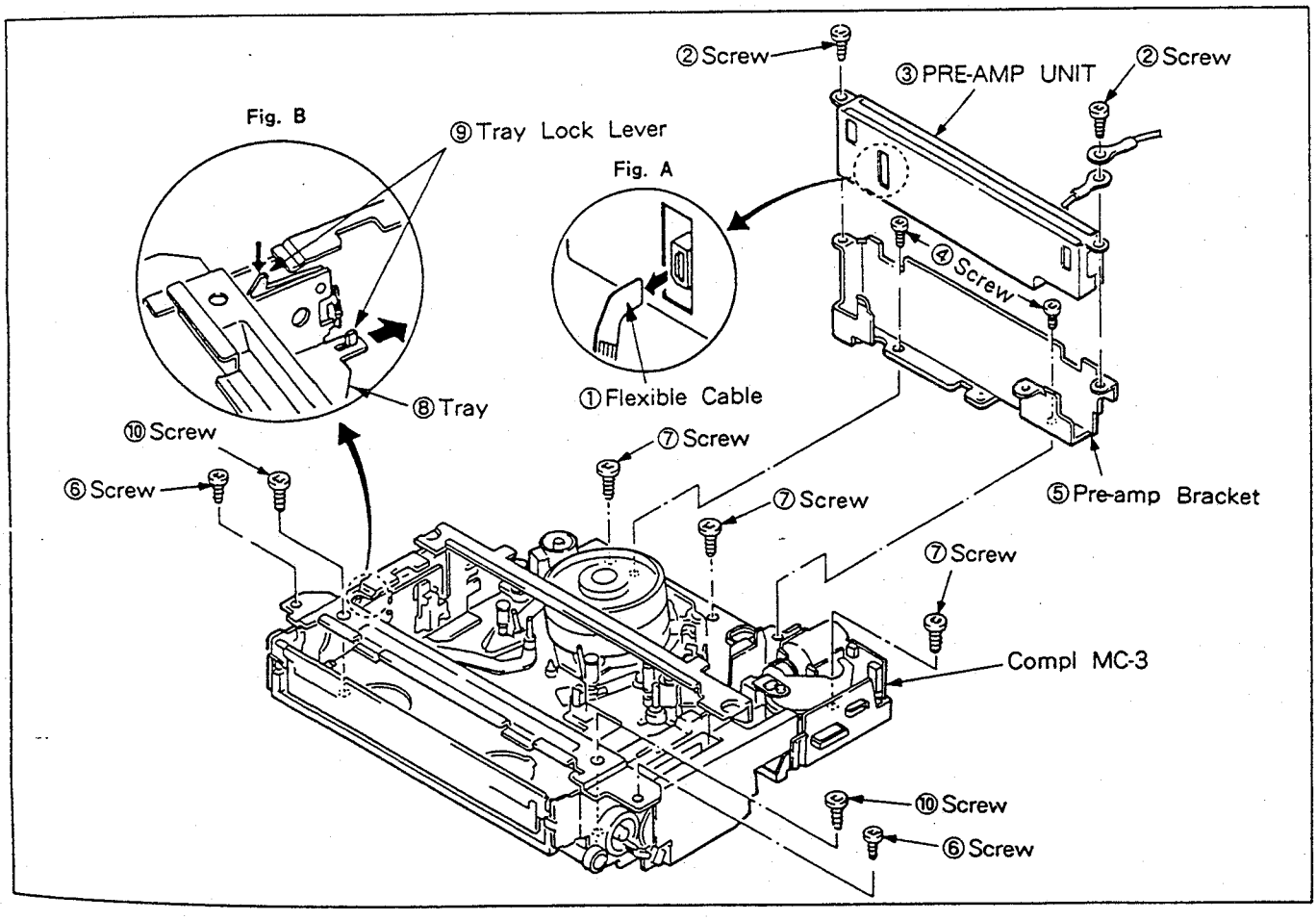


Fig. 5-1-1 Mecahnism Main Unit

5-2. CASSETTE HOLDER MECHANISM

5-2-1. COMPL Cassette Mechanism (See Fig. 5-2-1.)

1. Removal

1) Set the video main unit to the EJECT completed mode.
2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
3) Remove the two screws ①.
4) Remove the two screws ②.
5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance.
   Match positions of the FRONT LOADING GEAR △ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
4) Fix to the mechanism chassis with the two screws ②.
5) Fix to the chassis with the screw ①.
6) Connect to the various connectors.

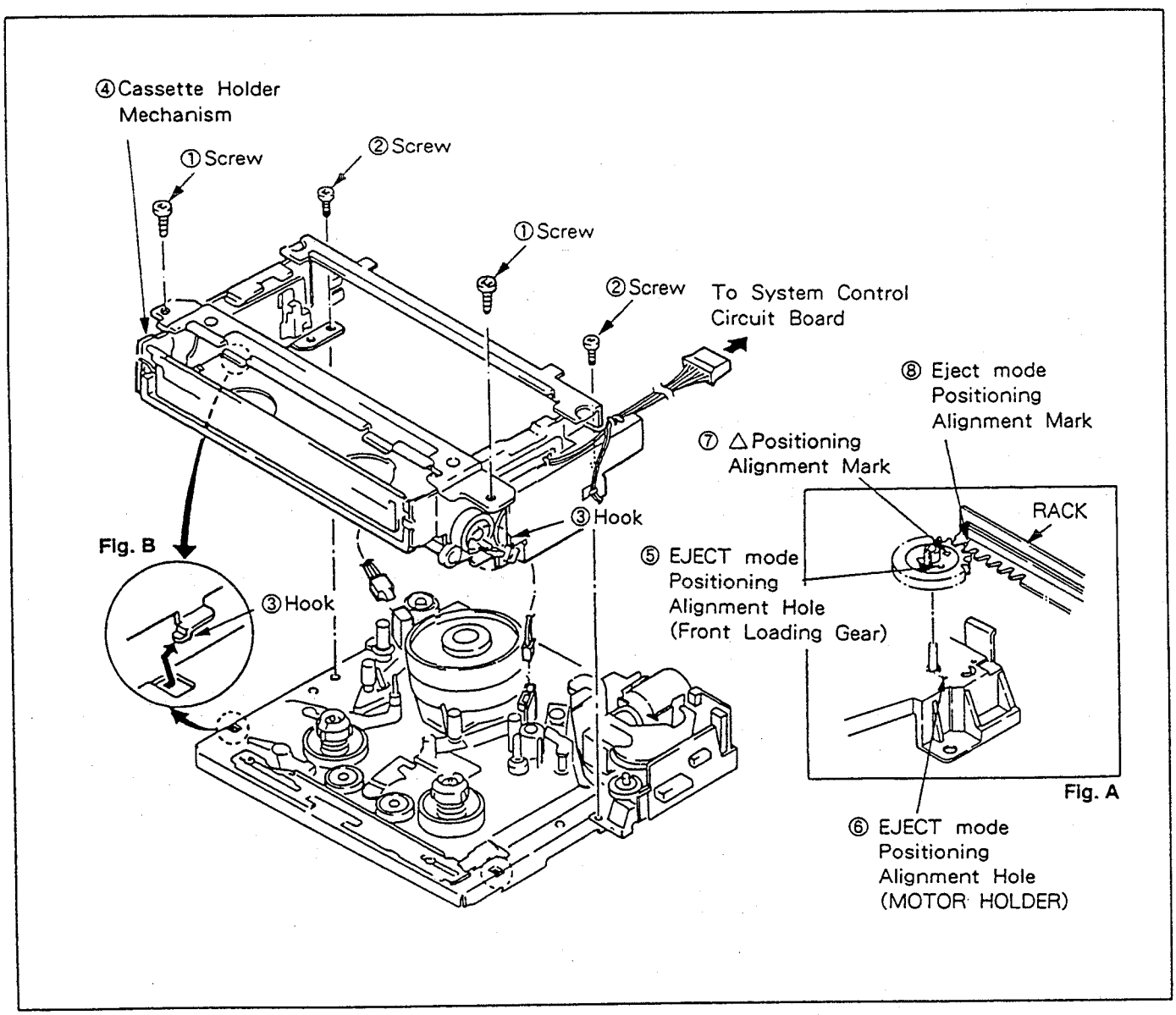


Fig. 5-2-1 Compl Cassette Mechanism

5-2-2. Gear Bracket Ass'y (See Fig. 5-2-2.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the three screws ①, then remove the GEAR BRACKET ASS'Y ② as shown in Fig. A.
3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
3) Apply grease to the toothed part of the RACK ⑦.
4) Fit the RACK ⑦ onto the two pins ⑨. Align the positioning alignment hole ⑪ to the positioning alignment hole ⑫ of the GEAR BRACKET.
5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.
   Align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑪ of RACK at that time.
6) Mount the E ring ③ onto the shaft ⑧.
7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using three screws ①.
   Align the positioning alignment hole Ⓐ of the IDLER GEAR with the positioning alignment hole Ⓑ of the SIDE BOARD as shown in Fig. 5-2-3 at this time.
   Also align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑫ of GEAR BRACKET by referring to Fig. 5-2-2. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.
8) Remount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

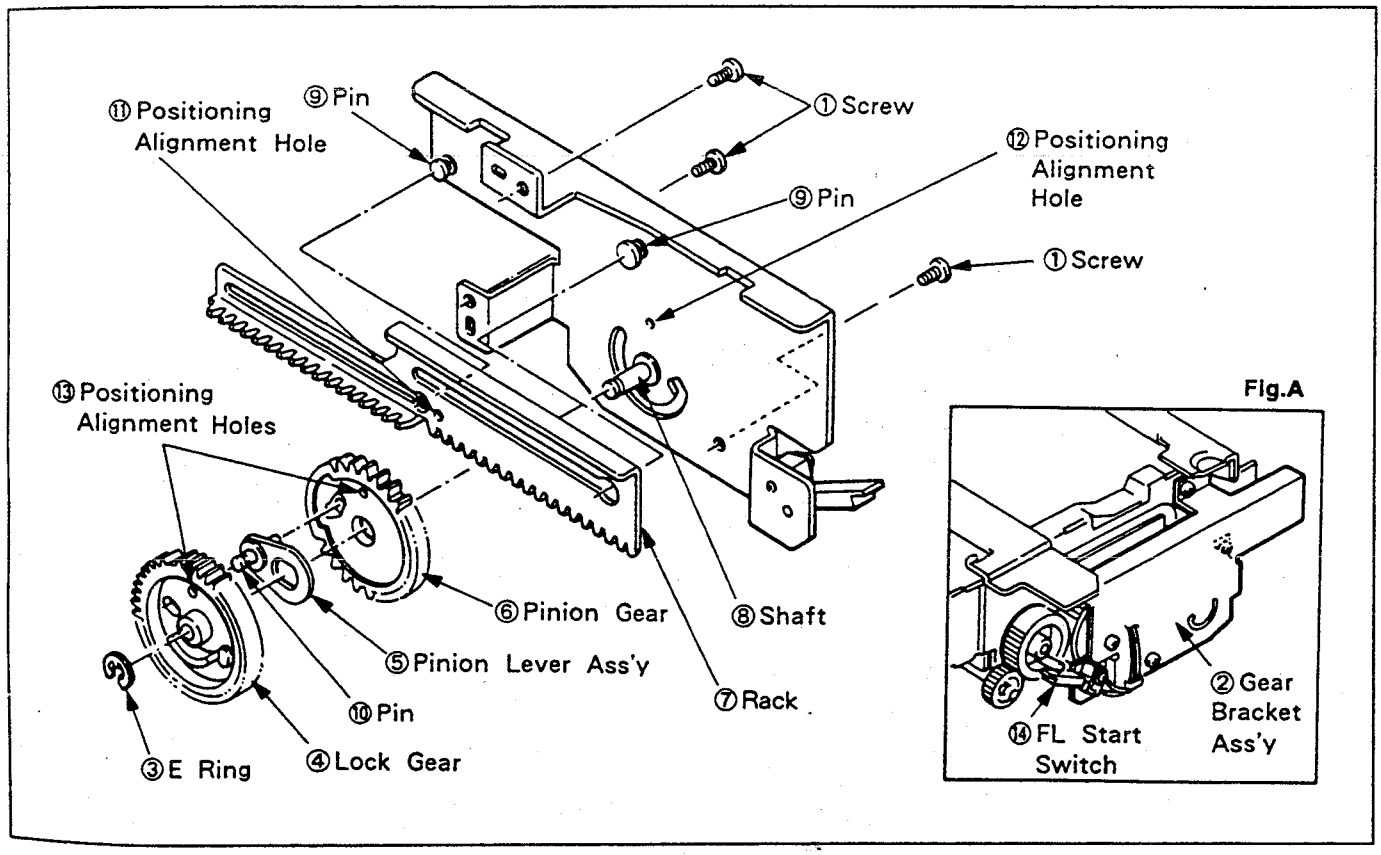


Fig. 5-2-2. Gear Bracket Ass'y

5-2-3. **Cassette Drive Gear (Right) (See Fig. 5-2-3.)**

1. Removal

1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 5-2-1. and 5-2-2., respectively.
2) Remove the IDLER GEAR ①.
3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
6) Remove the IDLER GEAR R ⑧.

2. Remounting

1) Apply grease to gear parts that undergo friction.
2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
5) Mount the E ring ④ onto the axle ⑫.
6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
8) Mount the IDLER GEAR ① onto the axle ⑭. When doing so, match position to the MAIN GEAR as shown in Fig. A.
9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 5-2-2. and 5-2-1., respectively.

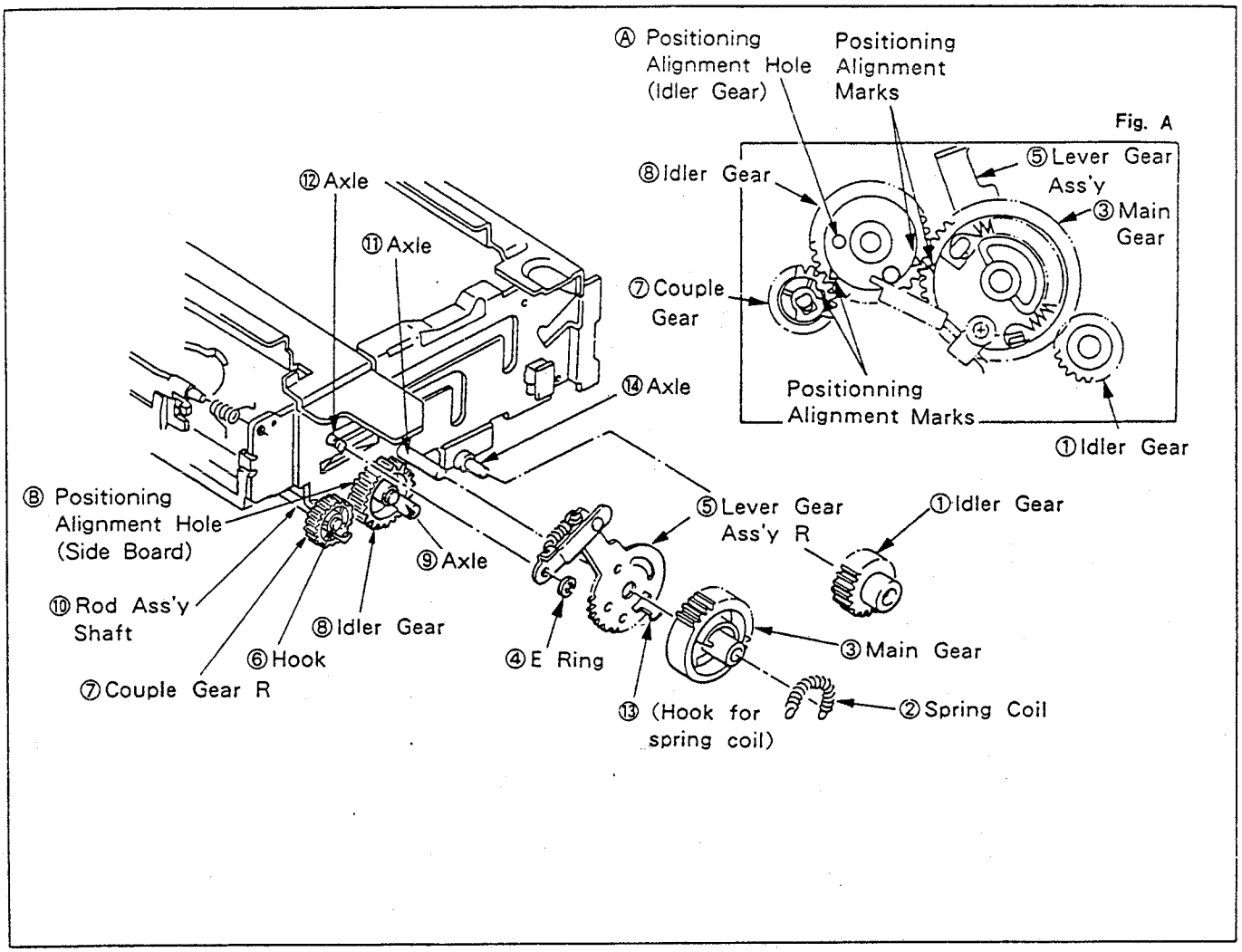


Fig. 5-2-3. Cassette Drive Gears (Right Side)

5-2-4. Cassette Drive Gear (Left) (See Fig. 5-2-4)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the E ring ②.
3) Open the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
4) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y L ④.

2. Remounting

1) Apply grease to the axle ⑨ and shaft ⑩.
2) Align with the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig B.
3) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
4) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Align with the IDLER GEAR L ⑥ as shown in Fig. B.
5) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 5-2-1.

Note: The end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.

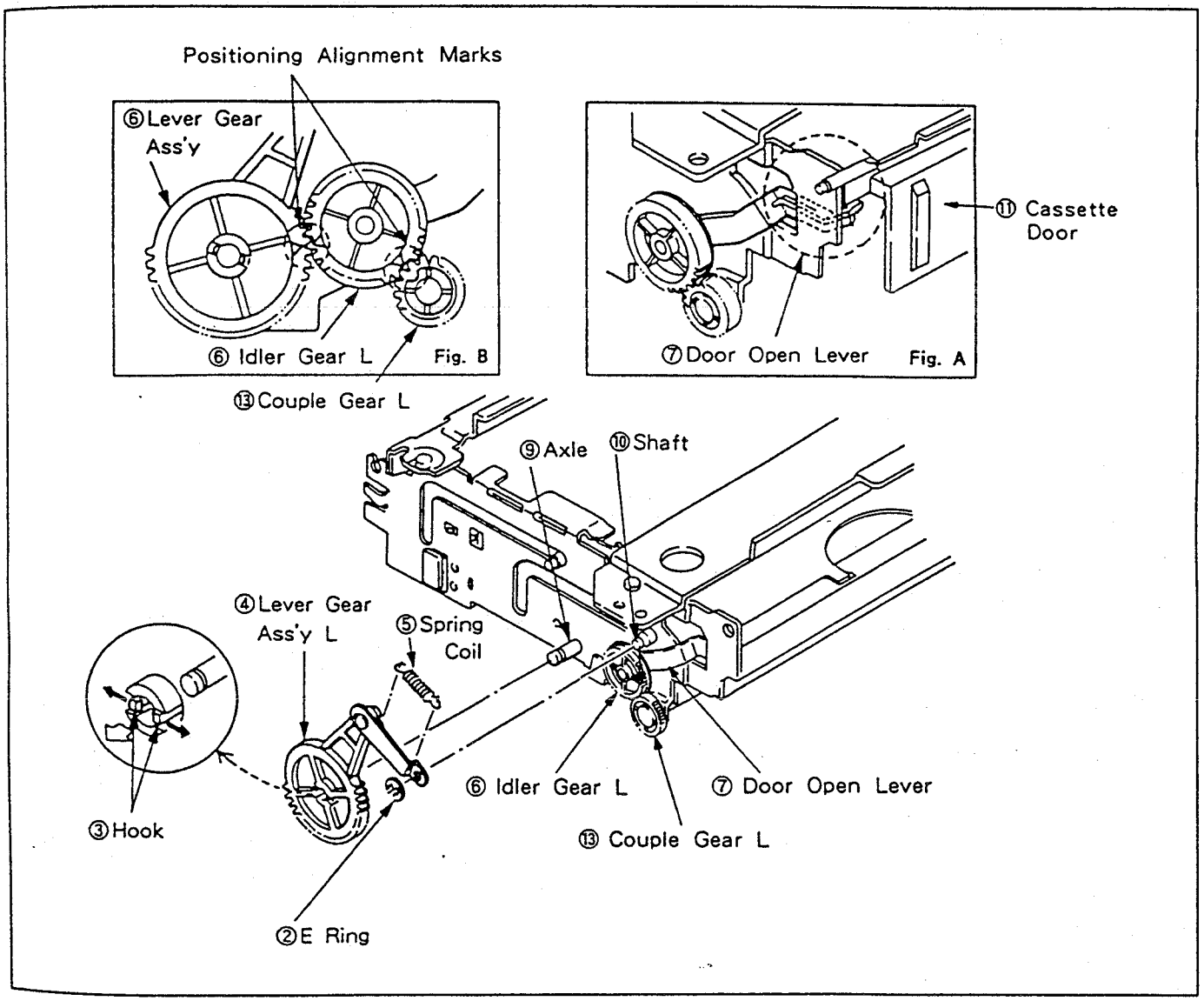


Fig. 5-2-4. Cassette Drive Gears (Left Side)

5-2-5. FL Start Switch (See Fig. 5-2-5.)

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the screw ①.
3) Remove the lead wire of the FL START SWITCH ②.

2. **Remounting**

1) Solder the lead wire to the FL START SWITCH ② terminal.
2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

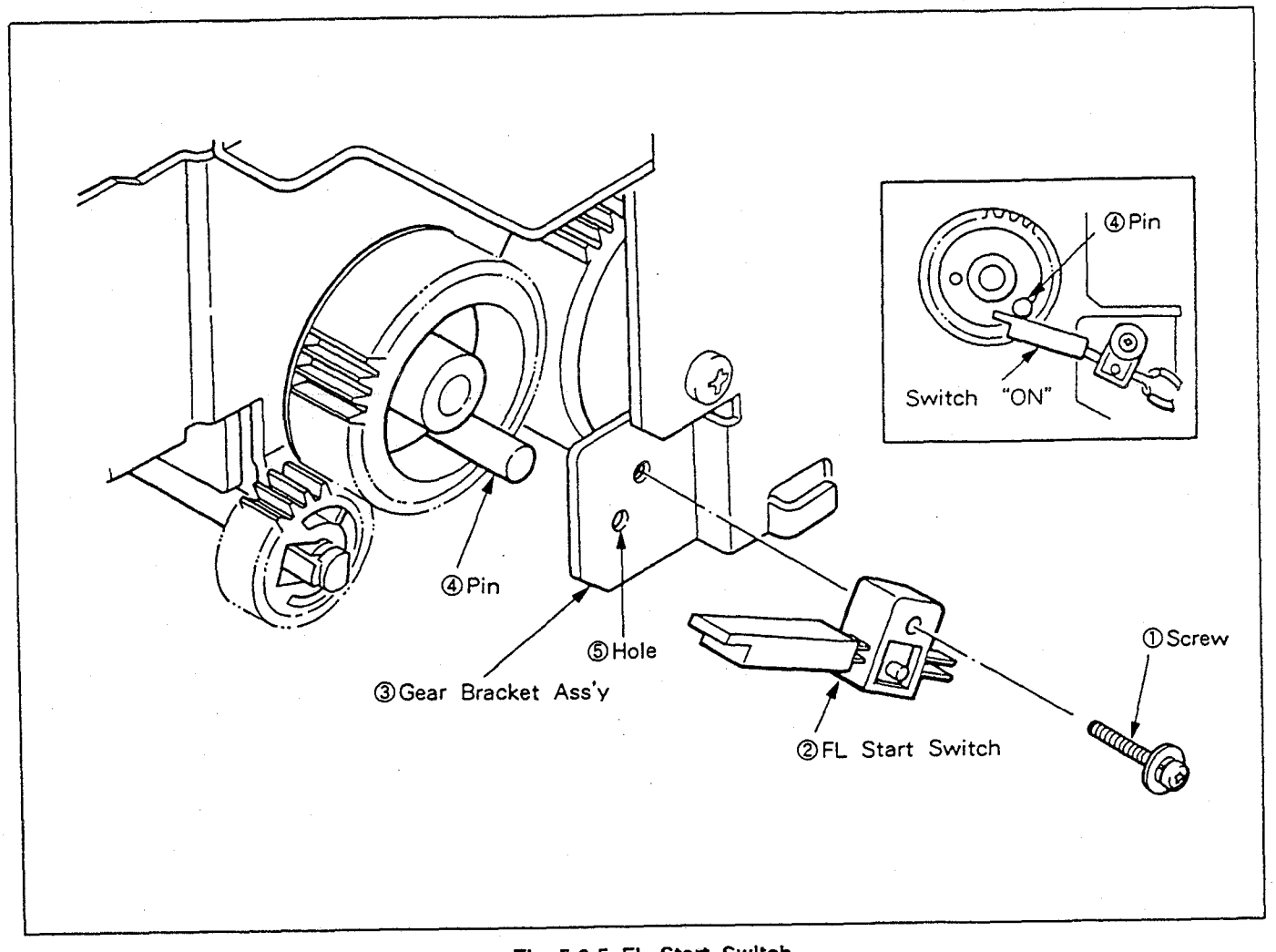


Fig. 5-2-5. FL Start Switch

5-2-6. T-Top Sensor, T-End Sensor (See Fig. 5-2-6.)

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 5-2-2.
3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. **Remounting**

1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③.
   Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
2) Mount the phototransistors ③ onto their respective holders.
3) Mount the LID ② and fix it with the hook ①.
4) Mount the GEAR BRACKET ASS'Y as instructed in 5-2-2.
5) Mount the COMPL CASSETTE MECHANISM as insturcted in 5-2-1.

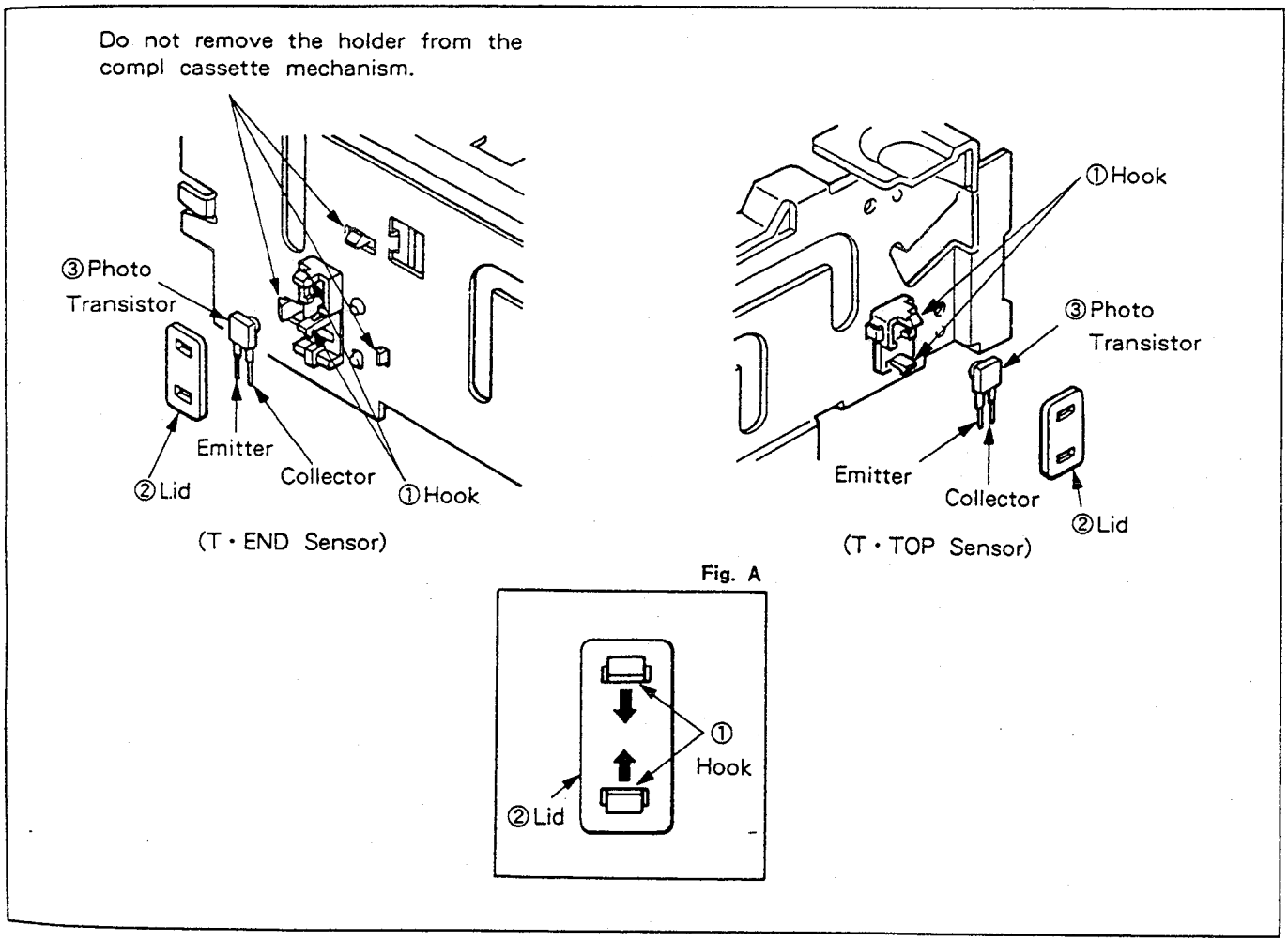


Fig. 5-2-6. T TOP Sensor & T END Sensor

5-3. COMPL HOLDER MOTOR (LOADING MOTOR BLOCK)

5-3-1. COMPL Motor Bracket

1. Removal

1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.
2) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (see Fig. 5-3-1.).

2. Remounting

1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. A.
2) Set the COMPL HOLDER MOTOR ② to the INITIAIL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING GEAR △ mark ⑥ is aligned with the MOTOR HOLDER INITIAL mode position mark ⑦ (see Fig. B.).
3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. C.).
4) Align the COMPL HOLDER MOTOR main unit ② with the protuberance ⑪, then mount it with the two screws ① and the other one ⑩.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 5-1.

Note : Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

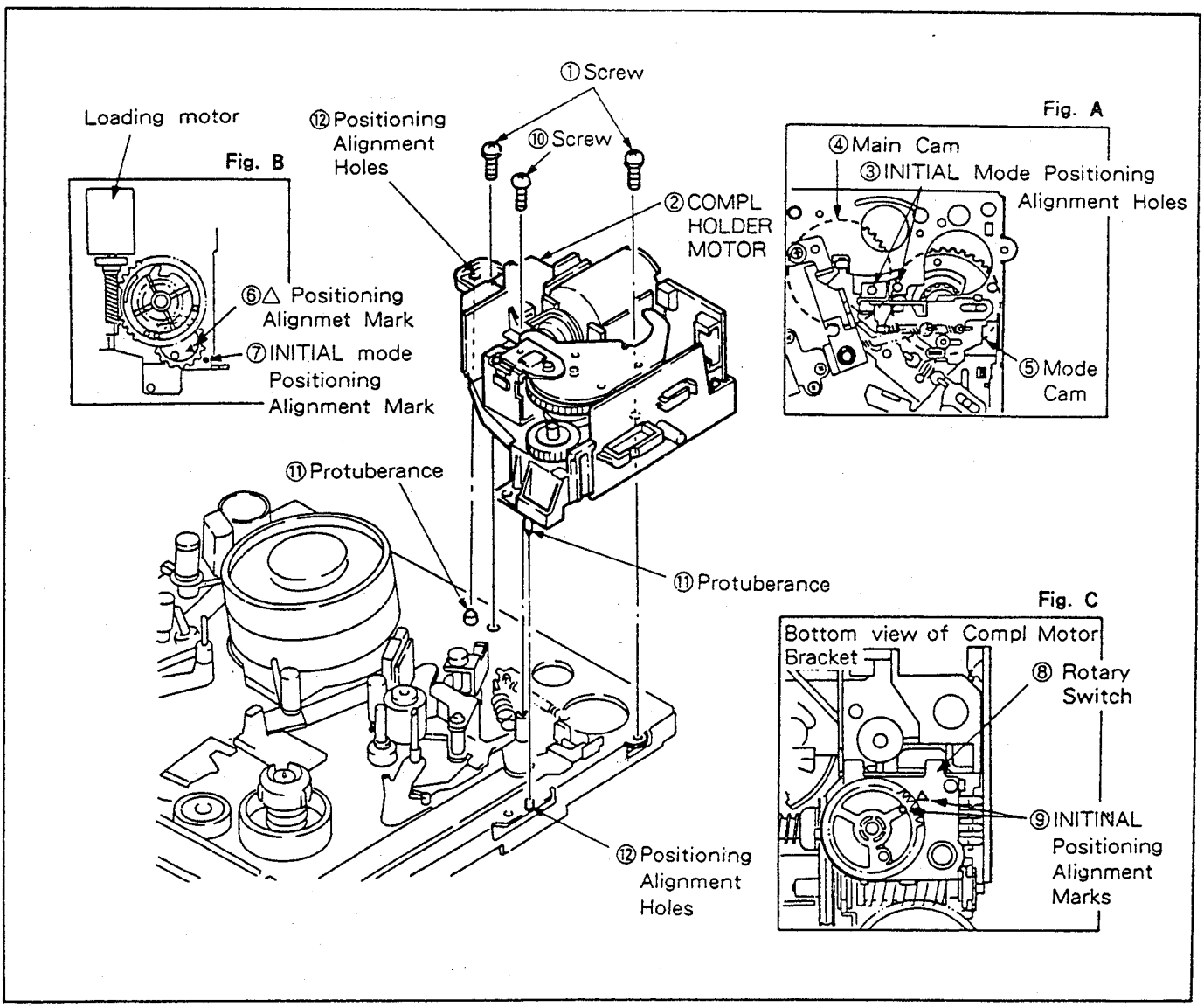


Fig. 5-3-1 Compl Holder Motor

5-3-2. Loading Motor (Refer to Fig. 5-3-2.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 5-3-1. The 1990 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
7) Remove LOADING BELT ⑨.
8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ⑪ and DAMPER ⑫ shown in Fig. 5-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

1) LOADING MOTOR ⑤ puts REAR SIDE BOSS ㉓ in the slit ㉔ of MOTOR HOLDER ⑩.
   Further, mount the tap hole ⑬ at two points of the front pulley side so that the it is secured to the PROTUBERANCE ⑭ of the MOTOR HOLDER at two points.
2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
3) Hang LOADING BELT ⑨ on the pulley.
4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 5-3-2., and is the position in which INITIAL POSITIONING ALIGNMENT HOLEs of MAIN CAM ⑮ and MODE CAM ⑯ are lined up with THROUGH HOLE ⑰ of MOTOR HOLDER. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑱ and INITIAL MARK ⑲ position of MOTOR HOLDER and the position relationship of CASSETTE HOLDER RACK ⑳.
6) Apply a light coat of grease to the entire sides of AXLE ㉑ and FRONT HELICAL GEAR ⑦.
7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉑. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉒ of FRONT LEVER ASS'Y.
8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
10) Attach the connector of DEW SENSOR ㉕ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

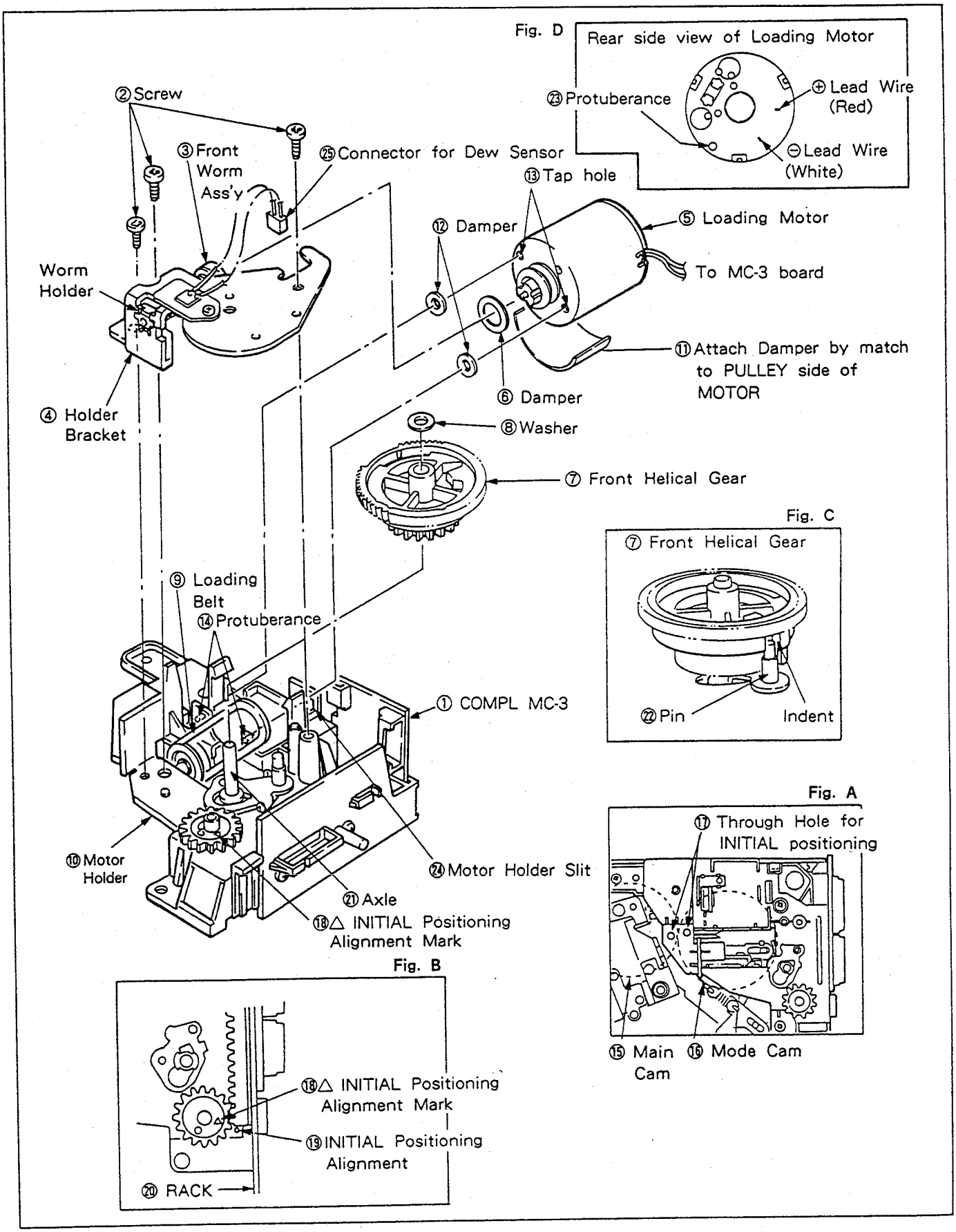


Fig. 5-3-2. Loading Motor

5-4. TAPE LOADING MECHANISM

5-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 5-4-1.)

1. Removal

1) Remove connectors from the DRUM MOTOR board (SV-5).
2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
3) Remove the three special washers ③ and ⑦, then remove the spacer ⑥, LOAD RACK ④ and MAIN CAM ⑧.
4) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
5) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note: Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

1) Apply grease to the hole ⑰ of the LOAD LEVER ASS'Y S ⑯, as shown in Fig. B.
2) Apply grease to the hole ㉒ of the LOAD LEVER ASS'Y T ⑫ as shown in Fig. A, and to the sections of the LOAD GEAR T ⑨ as indicated with an arrow in Fig. C.
3) Apply grease to GROOVE 1, GROOVE 2 and to the outer side of the MAIN CAM ⑧, shown in Fig. E.
4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
5) Apply grease to the outer surface of axles ⑲, ⑳ and ㉘.
6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the hole ⑰ of the LOAD LEVER ASS'Y S.
7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ⑳. When doing so, align the INITIAL mode positioning alignment holes ㉑ of the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the ROLLER BASE T pin ㉓ into the hole ㉒ of the LOAD LEVER ASS'Y T ⑫.
8) Mount the MAIN CAM ⑧ onto the axle ㉙. At that time, make sure that the INITIAL mode positioning alignment holes ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉔ match the INITIAL mode positioning alignment holes ㉞ of the MECHANISM CHASSIS. Also check to be sure that the pin ㉗ of the CAM PINCH LEVER ASS'Y is put in the GROOVE 1 of the MAIN CAM as shown in Fig. E.
9) Mount the LOAD RACK ④ onto the axles ㉖ and ㉛. At that time, set the INITIAL mode positioning alignment marks ㉜ of the LOAD RACK ④ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the LOAD RACK pin ㉙ into the MAIN CAM GROOVE 2 as shown in Fig. E.
10) Mount the spacer ⑥ and the special washer ⑦ onto the axle ㉖.
11) Mount the two special washers ③ onto the two axles ㉛.
12) Mount the REINFORCE BRACKET ② with the three screws ①.
13) Insert the connector into the DRUM MOTOR board (SV-5).
14) Confirm that loading and unloading are performed smoothly.

Note: Be sure to perform INITIAL mode positioning of cams and gears precisely.

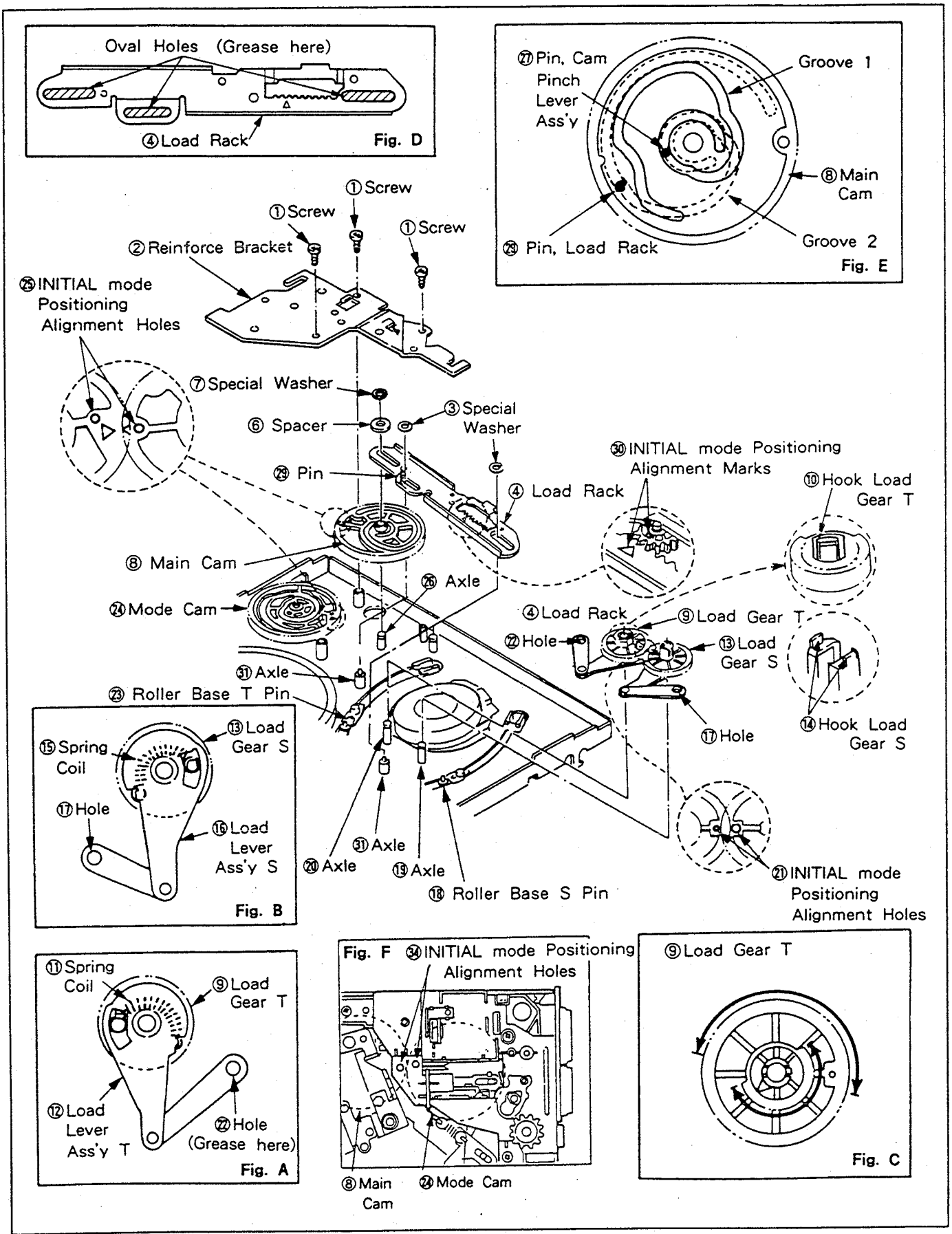


Fig. 5-4-1. Loading Mechanism Main Parts

5-4-2. Mode Cam (See Fig. 5-4-2.)

1. Removal

1) Set the INITIAL mode with the mode selector (VHJ-0050).
2) Remove the REINFORCE BRACKET as instructed in 5-4-1.
3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
4) Remove the MODE CAM ③.

2. Remounting

1) Referring to 5-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 5-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
6) Mount the two special washers ① onto the axles ⑥ and ⑦.
7) Mount the REINFORCE BRACKET as instructed in 5-4-1.

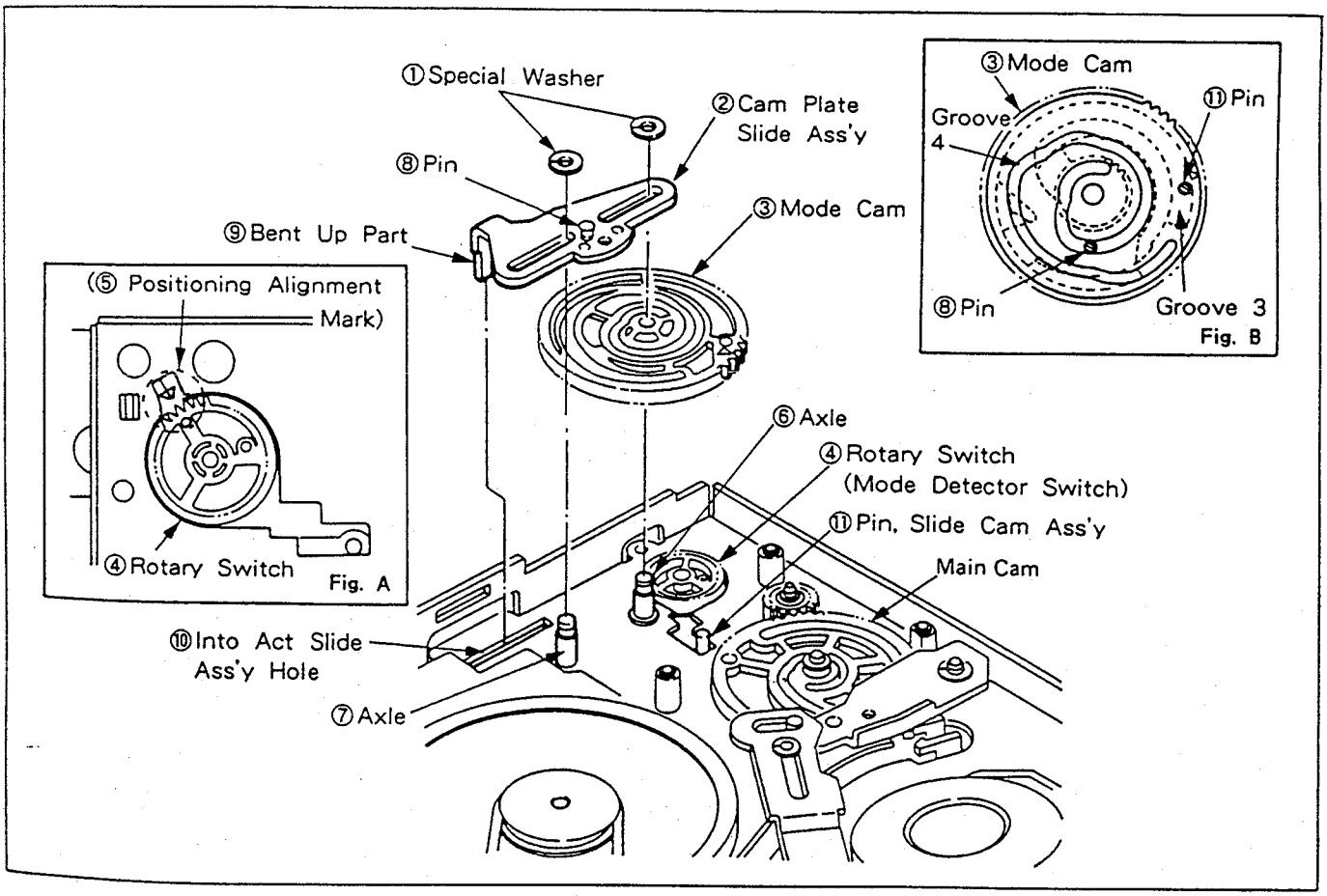


Fig. 5-4-2. Mode Cam

5-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 5-5-1.)

1. Removal

1) Remove the COMPL HEAD BRACKET special mounting nut ②.
2) Remove the SLEEVE ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note : Take care not to scratch or soil the ACE head surface.

2. Remounting

1) Apply grease to the axle ⑥ as shown in Fig. A.
2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SLEEVE ③.
5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
6) Perform ACE head adjustment as instructed in 6-4.

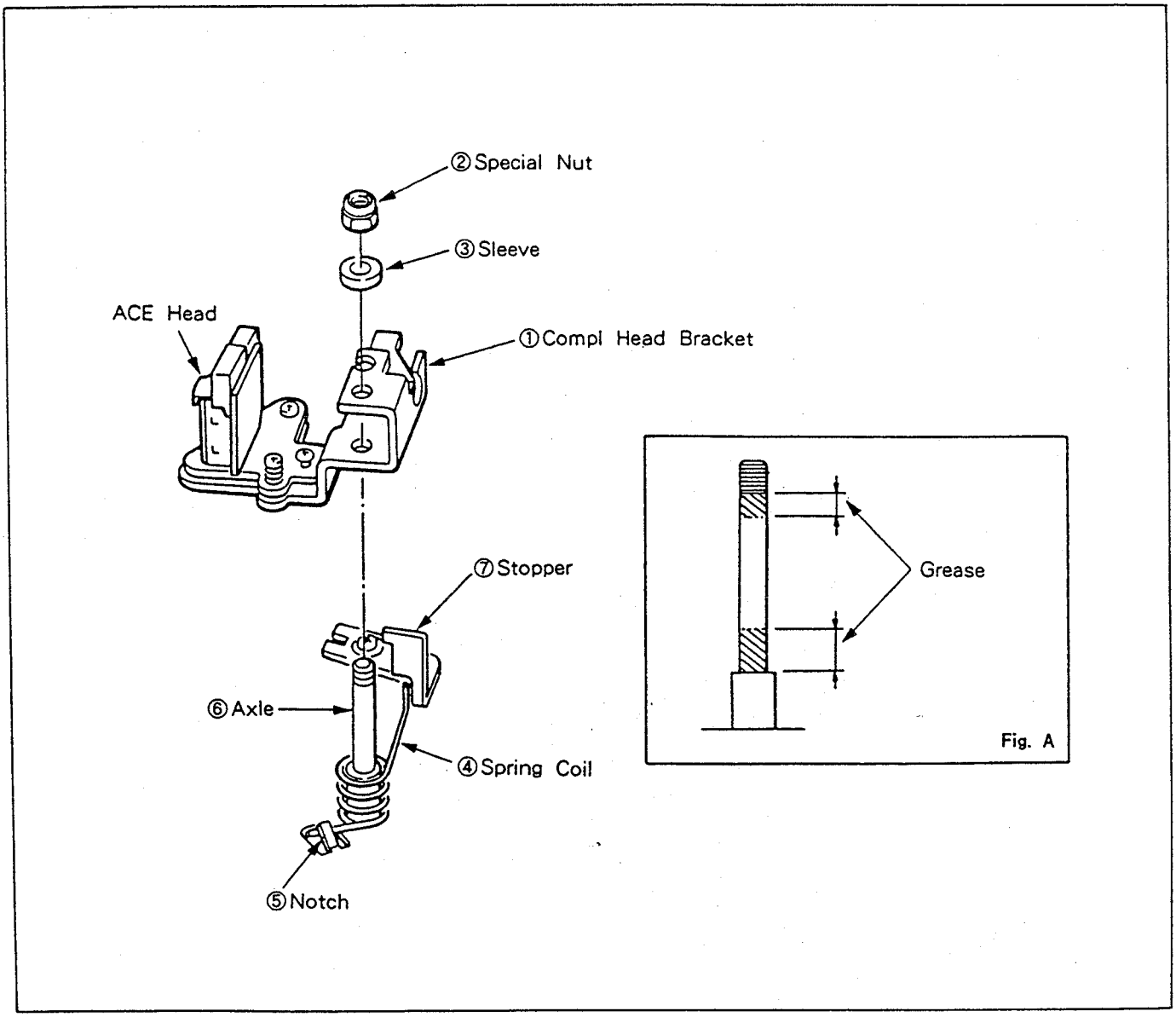


Fig. 5-5-1. Compl Head Bracket (ACE Head)

5-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 5-6-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the COMPL HEAD BRACKET as instructed in 5-5.
3) Remove the PINCH SPRING COIL ①.
4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
5) Remove the REV GUIDE LEVER SPRING COIL ④.
6) Remove REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 5-6-2 to widen the hook of the plastic bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
7) Remove the SLIDE BRAKE SPRING COIL ⑦.
8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note: If the hook ⑤ of the plastic bearing is damaged, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASS'Y".

2. Remounting

1) Apply grease to pins ⑫/⑬ and axles ⑯/⑱.
2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
3) Set the INITIAL mode with the mode selector (VHJ-0050).
4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑯ while inserting the ACT PINCH SLIDE ASS'Y pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
6) Mount the special washer ⑧ onto the axle ⑯.
7) Hook the SLIDE BRAKE SPRING COIL ⑦ to the plastic pin ⑲.
8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
9) Hook the REV GUIDE LEVER SPRING COIL ④.
10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑱.
11) Mount the special washer ② to the axle ⑱.
12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
13) Mount the COMPL HEAD BRACKET as instructed in 5-5.
14) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
15) Perform ACE head adjustment as instructed in 6-4.

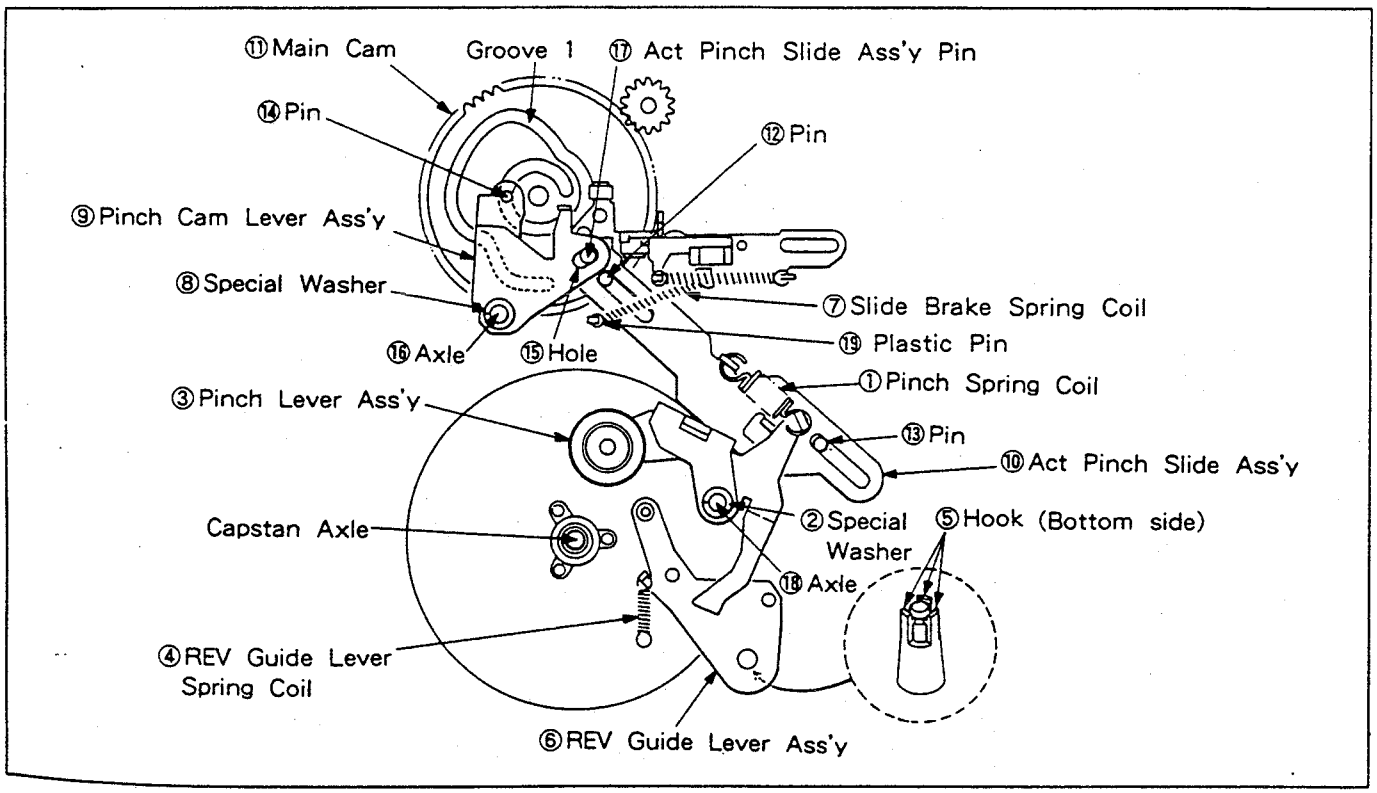
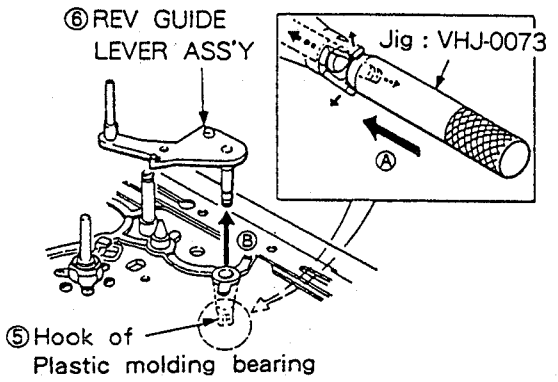


Fig. 5-6-1. Pinch Roller Pressure Mechanism



Remove REV GUIDE LEVER ASS'Y in the direction of arrow Ⓑ, pushing VHJ-0073 slightly in the direction of arrow Ⓐ.
Be careful not to damage the hook by pushing too much.

Fig. 5-6-2 Method of Using the Jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows :

1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 411 109 1605. This stop washer (Part No. 411 109 1605) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.
   Remove the REV GUIDE LEVER ASSEMBLY toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.

Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

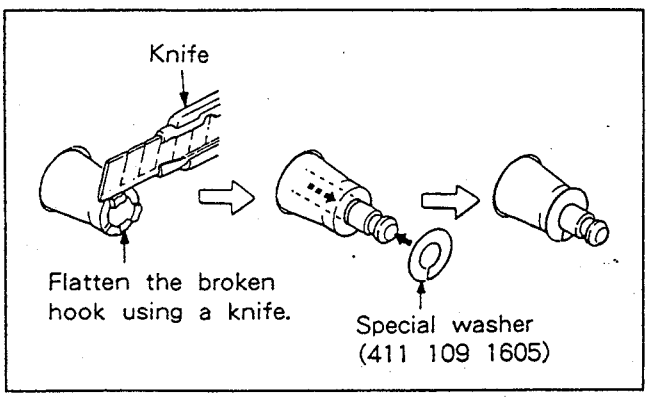


Fig. 5-6-3 Method of Repairing the Bearinig Section of the REV GUIDE LEVER ASSEMBLYE

5-7. BRAKE MECHANISM

5-7-1. Sub Take-up Brake Ass'y (See Fig. 5-7-1.)

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. **Remounting**

1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
2) Fit the SPRING COIL between hooks ⑤ and ⑥.
3) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

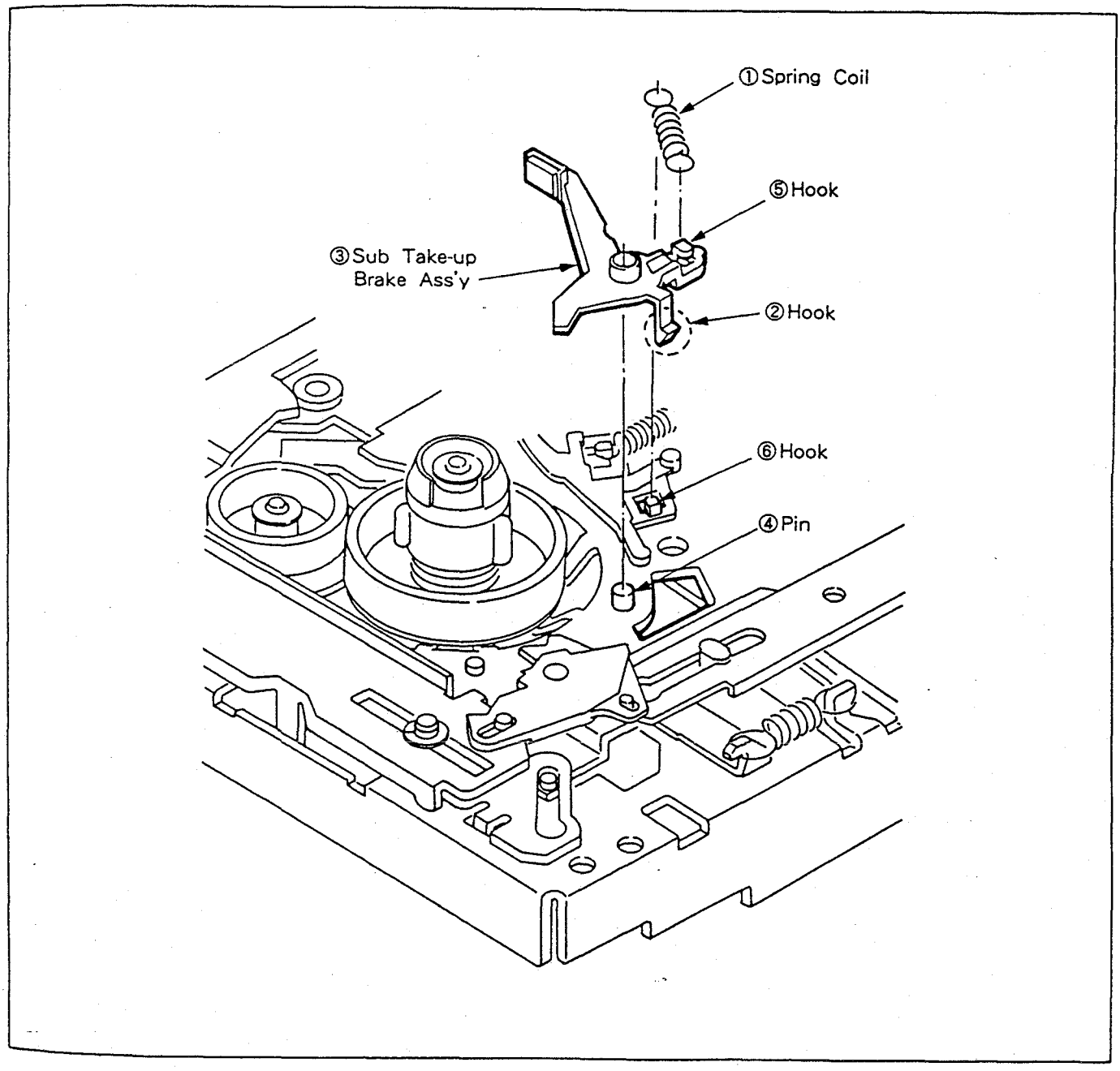


Fig. 5-7-1. Sub Take-up Brake Ass'y

5-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 5-7-2.)

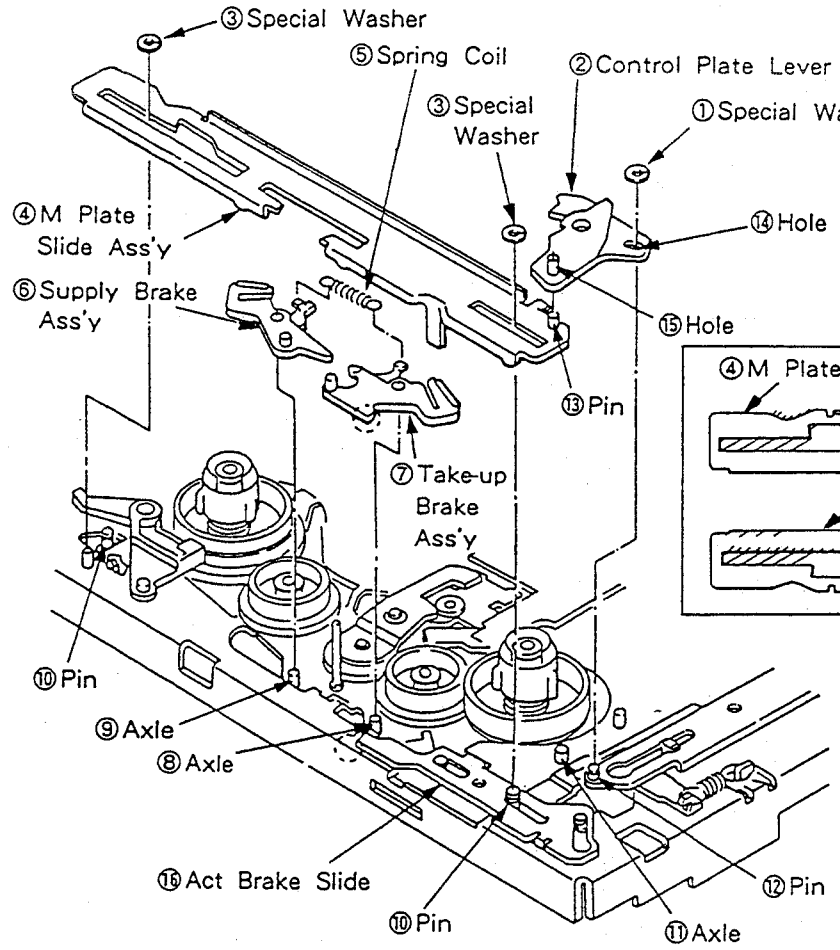
1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SUB TAKE-UP BRAKE as instructed in 5-7-1.
3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
5) Remove the SPRING COIL ⑤.
6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note : Take care not to soil the brake shoes.

2. Remounting

1) Apply a thin layer of grease to axles ⑧ and ⑨.
2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
5) Mount the two special washers ③ onto the two pins ⑩.
6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
7) Mount the special washer ① onto the pin ⑫.
8) Mount the SUB TAKE-UP BRAKE as instructed in 5-7-1.
9) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.



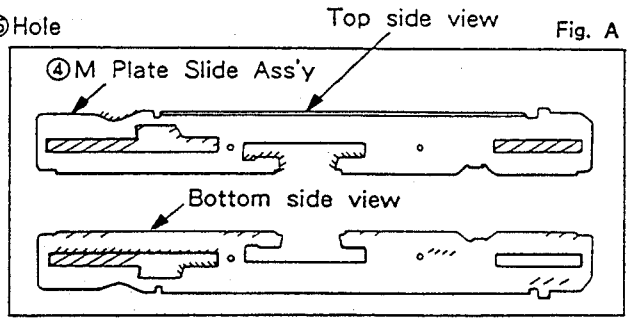


Fig. A

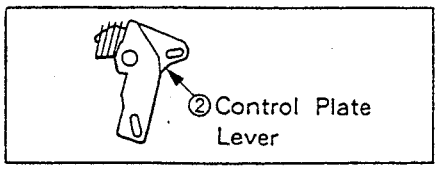


Fig. B

: Apply grease portion

When assembling, the contact surfaces of Take-up Brake ⑦ and the Brake Slide ⑯ marked with ⁘ should contact but not overlap each other.

Fig. 5-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

5-7-3. **Tension Lever Ass'y and Band Holder Ass'y (See Fig. 5-7-3.)**

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the SPRING COIL ①.
3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. **Remounting**

1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, mount the BAND HOLDER ASS'Y ② with the screw ③.
4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
5) Perform TENSION POLE position adjustment as instructed in 6-3.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

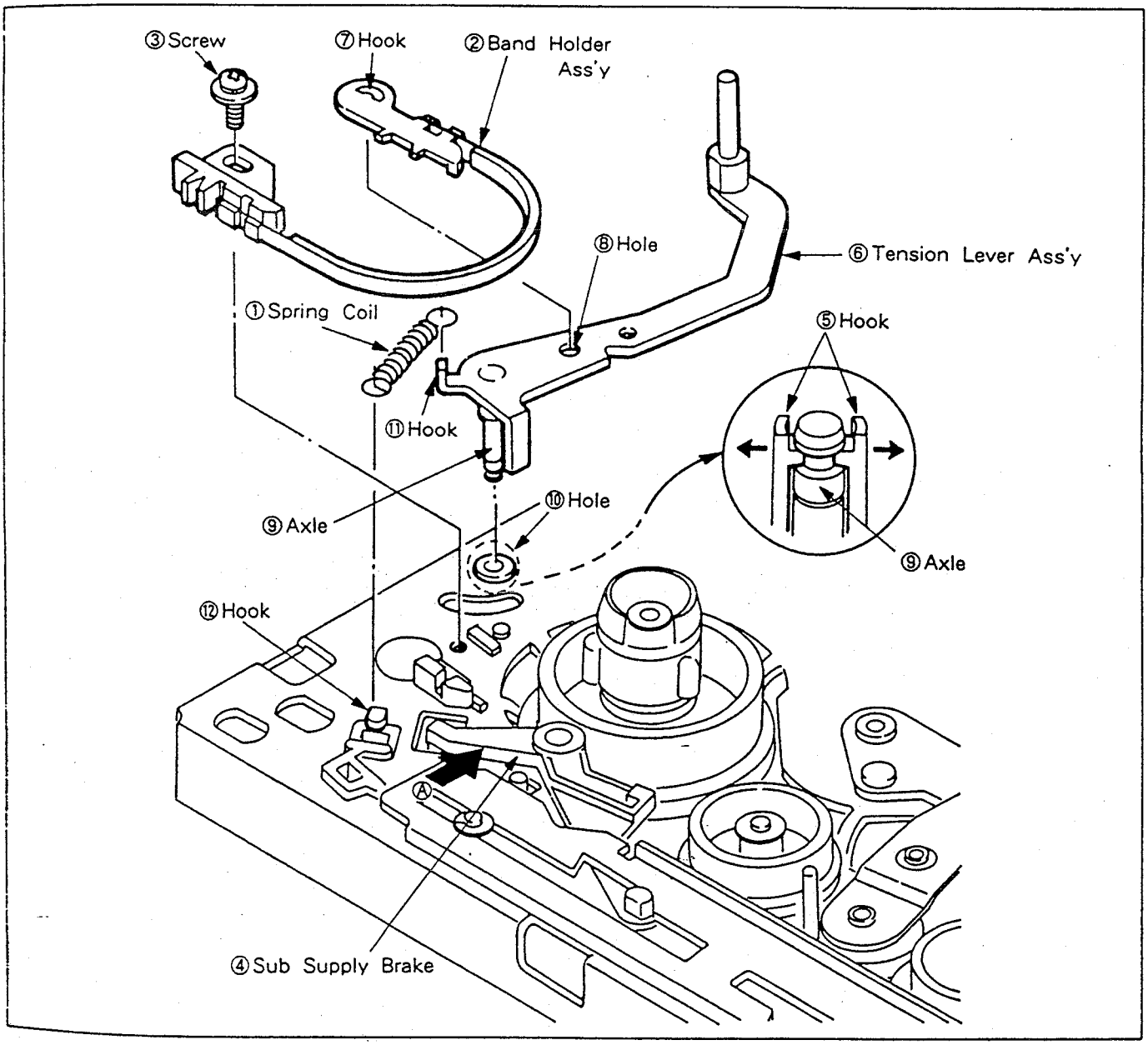


Fig. 5-7-3. Tension Lever Ass'y & Band Holder Ass'y

5-7-4. Capstan Brake Ass'y (See Fig. 5-7-4.)

1. Removal

1) Remove the SPRING COIL ①.
2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

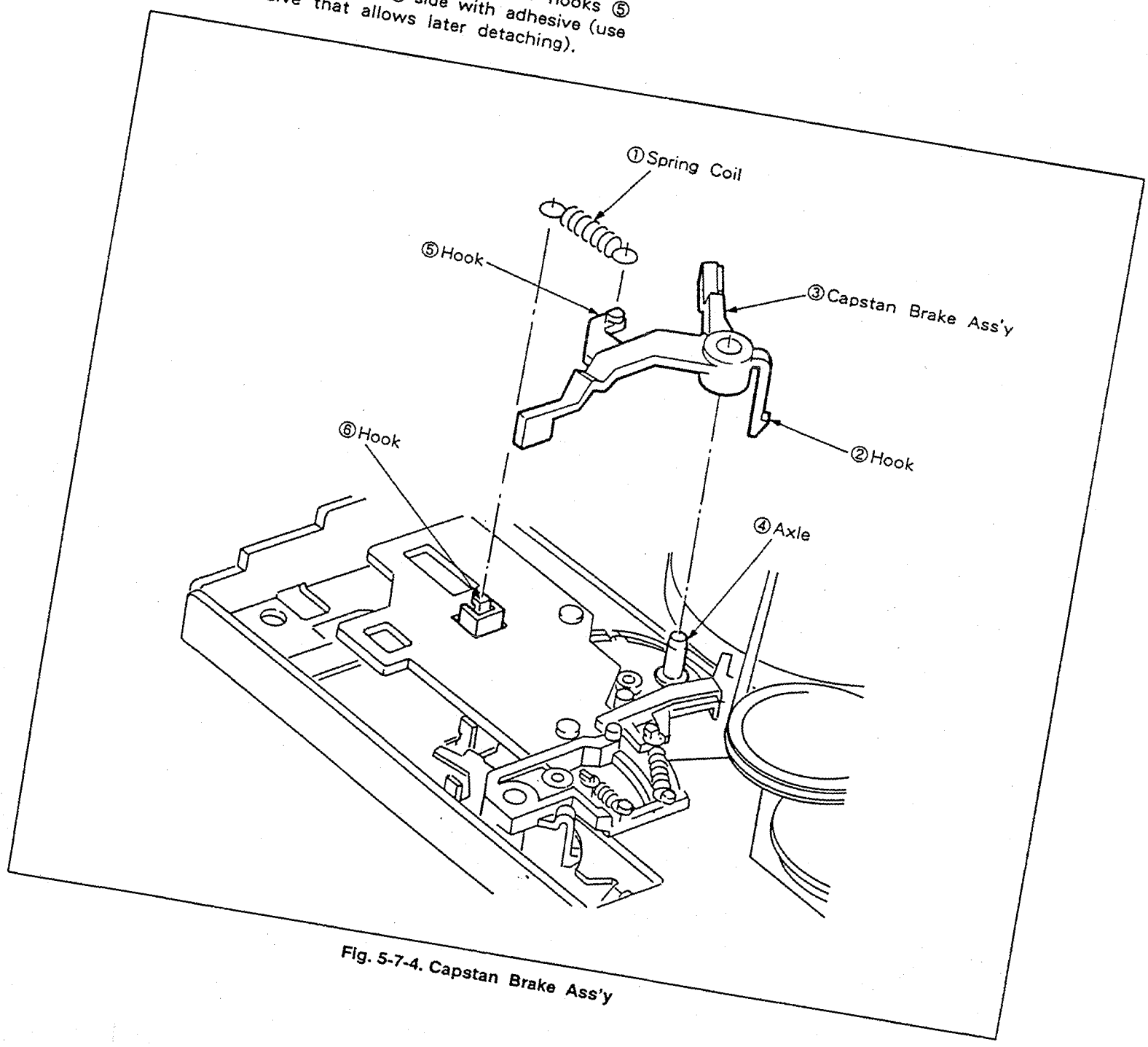


Fig. 5-7-4. Capstan Brake Ass'y

5-8. REEL TABLE DRIVE MECHANISM

5-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 5-8-1.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the BAND HOLDER ASS'Y as instructed in 5-7-3.
3) Set the PLAY mode with the mode selector (VHJ-0050).
4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
5) Remove the special washer ④.
6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
3) Mount the special washer ④ to the axle ⑧.
4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
6) Perform reel table height adjustment as instructed in 6-2-1.
7) Mount the special washer ① onto the axle ⑨.
8) Mount the BAND HOLDER ASS'Y as instructed in 5-7-3.
9) Perform tension pole position adjustment as instructed in 6-3.
10) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

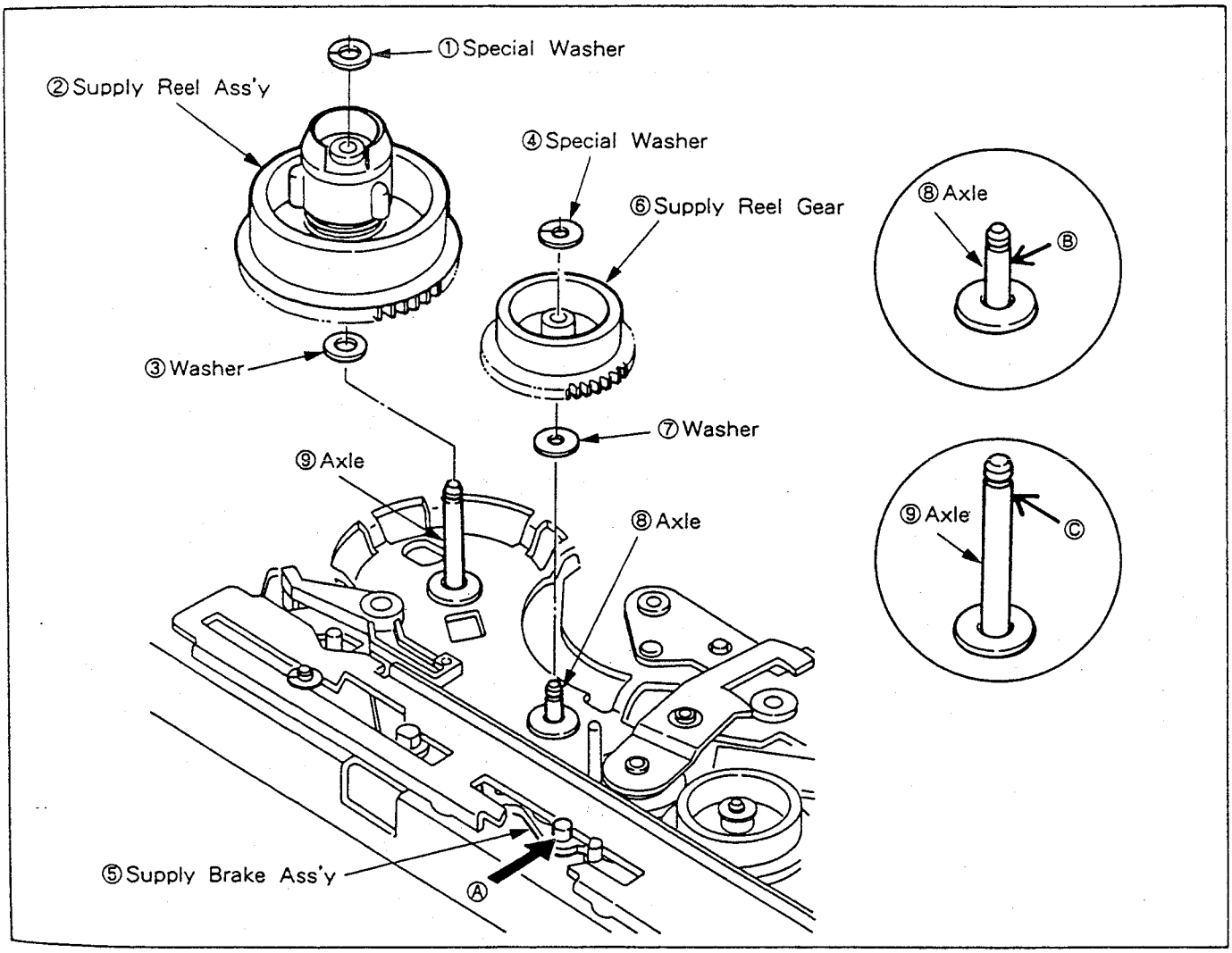


Fig. 5-8-1. Supply Reel Ass'y & Supply Reel Gear

5-8-2. Take-up Reel Ass'y (See Fig. 5-8-2.)

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the special washer ①.
3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. **Remounting**

1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
3) Perform reel table height adjustment as instructed in 6-2.
4) Mount the special washer ① onto the axle ⑤.
5) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

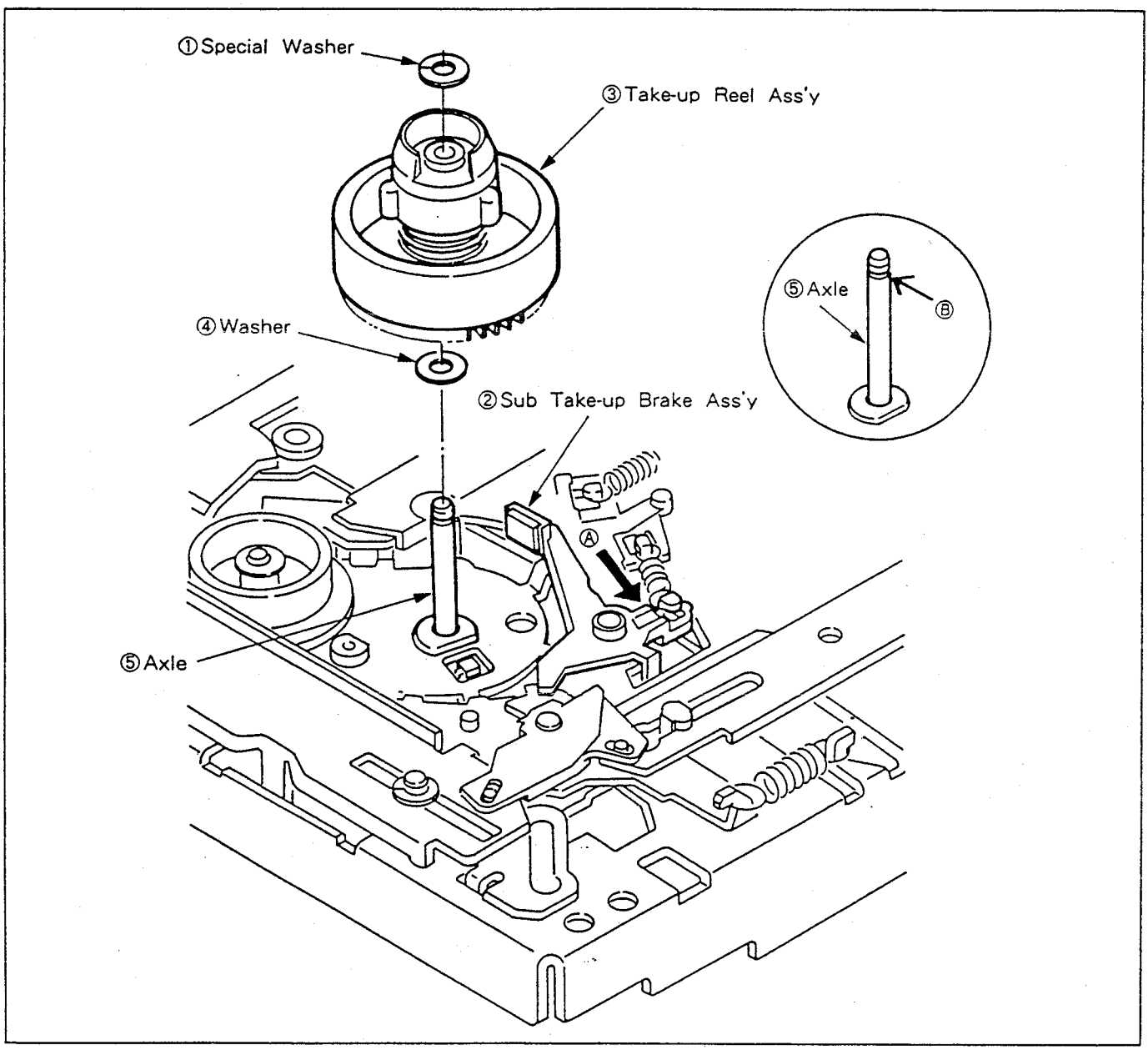


Fig. 5-8-2. Take-up Reel Ass'y

5-8-3. **Take-up Reel Gear (See Fig. 5-8-3.)**

1. **Removal**

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. **Remounting**

1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
3) Mount the special washer ① onto the axle ⑤.
4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 5-7-2.
5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 5-7-1.
6) Mount the TAKE-UP REEL ASS'Y as instructed in 5-8-2.
7) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.

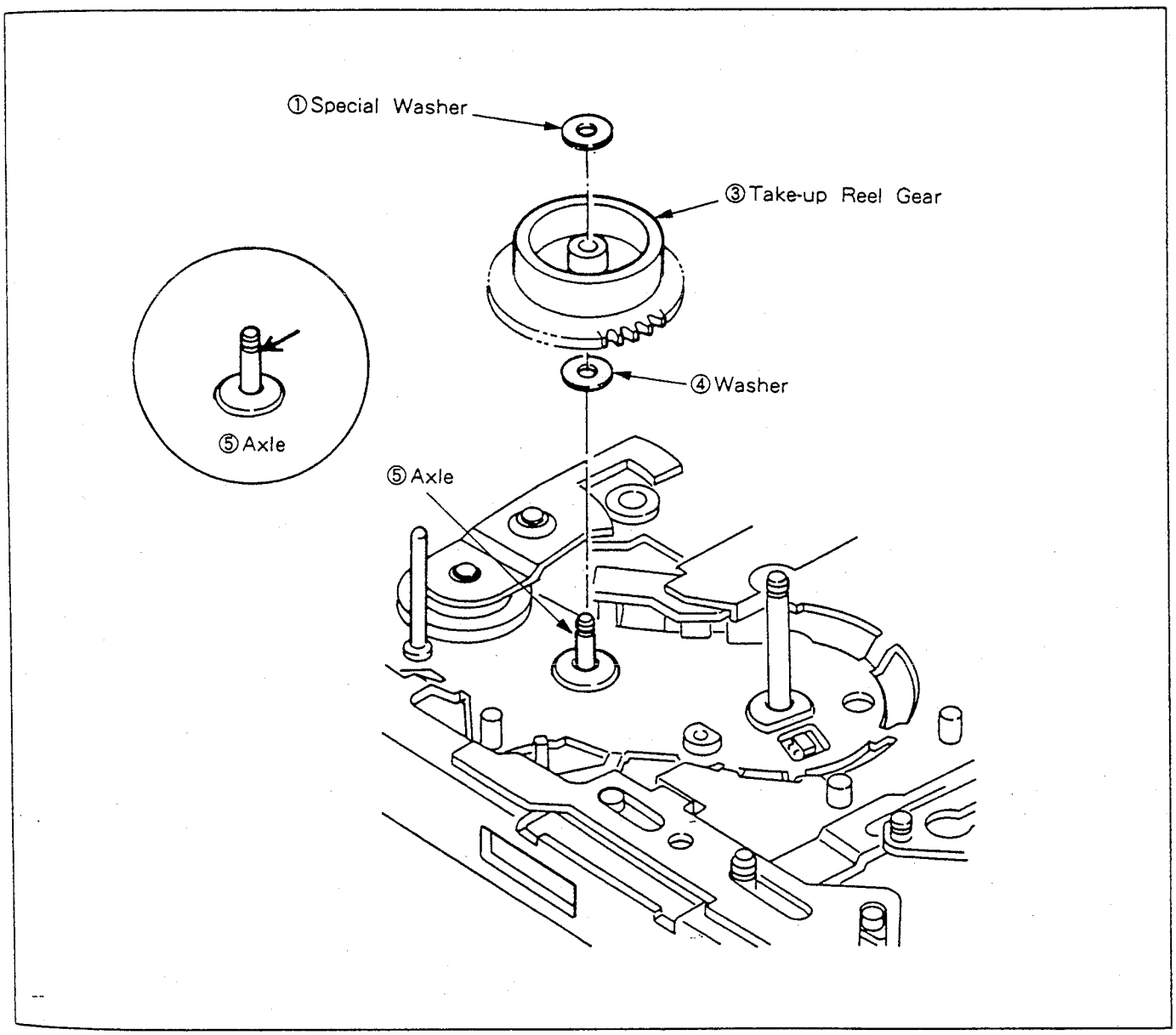


Fig. 5-8-3. TaKe-up Reel Gear

5-8-4. Reel Pulley and Friction Gear Ass'y (See Fig. 5-8-4.)

1. Removal

1) Remove the REEL DRIVE BELT ③.
2) Remove the special washer ④, then remove the REEL PULLEY ⑤.
3) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with arrows.
2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
3) Mount the special washer ⑥ onto the axle ⑨.
4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
5) Mount the special washer ④ onto the axle ⑩.
6) Set the REEL DRIVE BELT ③.

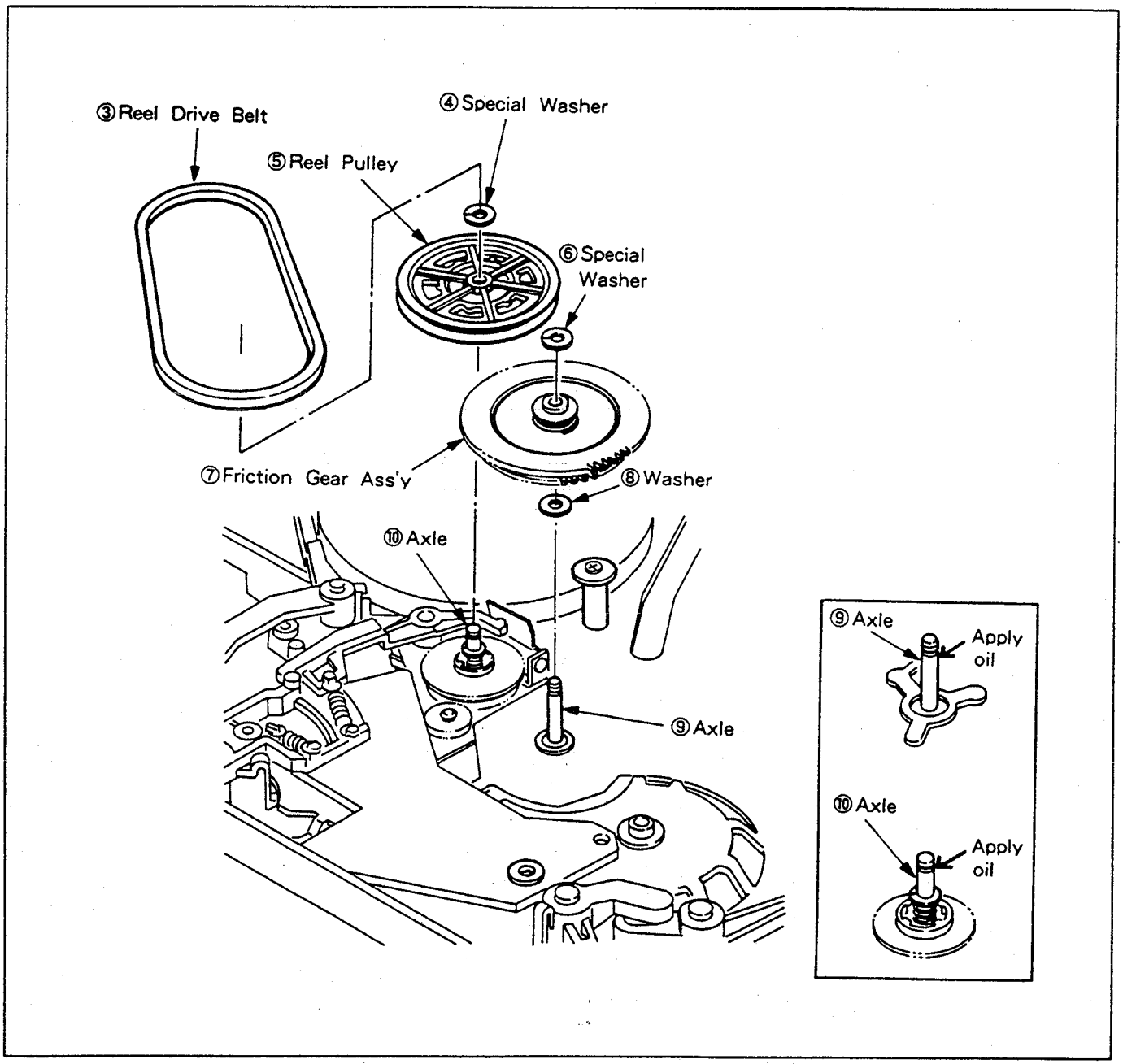


Fig. 5-8-4. Reel Pulley & Friction Gear

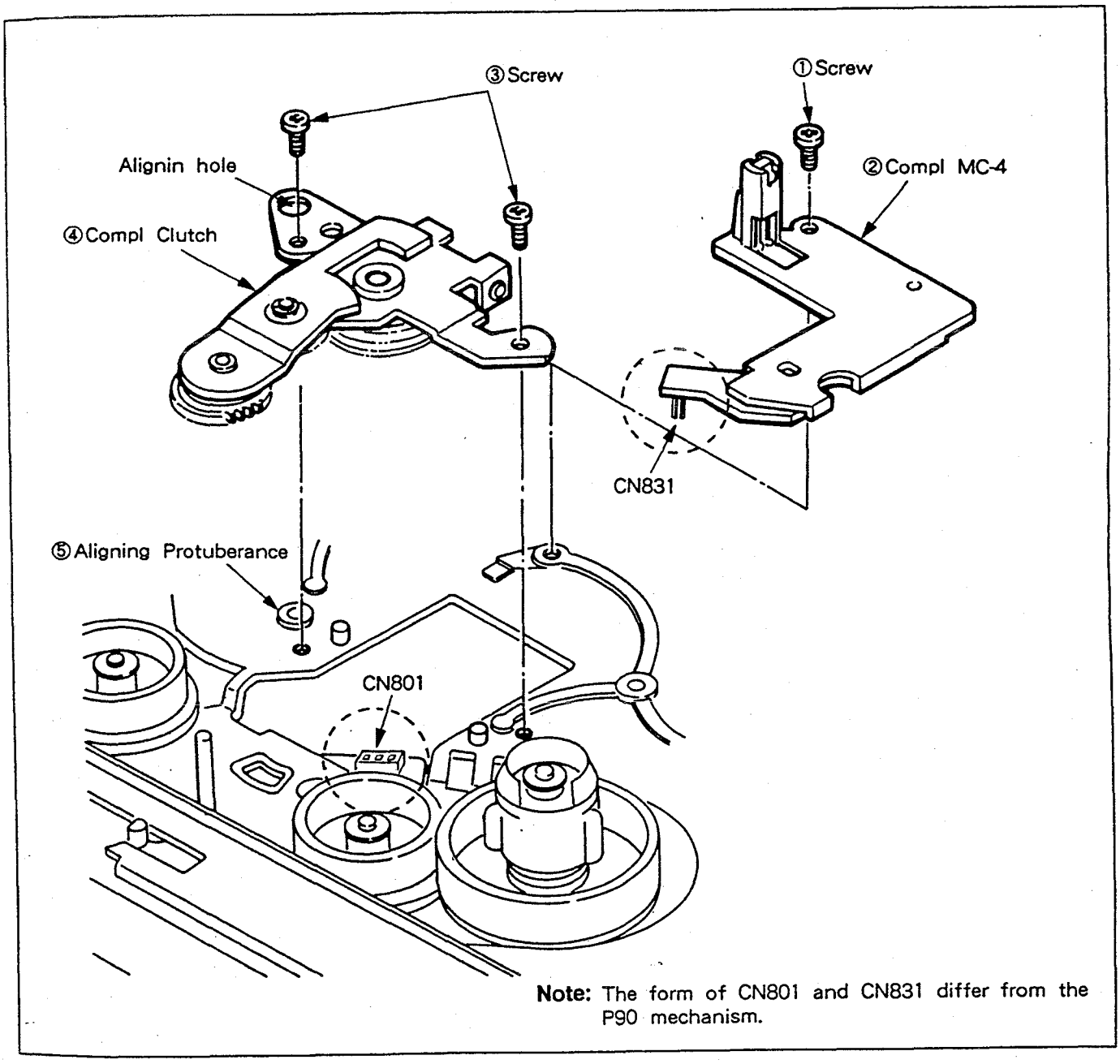
5-8-5. COMPL Clutch (See Fig. 5-8-5.)

1. Removal

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1.
2) Remove the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the screw ①, then remove the COMPL MC-4 ②.
4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
3) Mount the REEL PULLEY and REEL DRIVE BELT as instructed in 5-8-4.
4) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1.



Note: The form of CN801 and CN831 differ from the P90 mechanism.

Fig. 5-8-5. Compl Clutch

5-8-6. Clutch Change Lever and Clutch Lever Ass'y (See Fig. 5-8-6.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
3) Remove the SPRING COIL ①.
4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

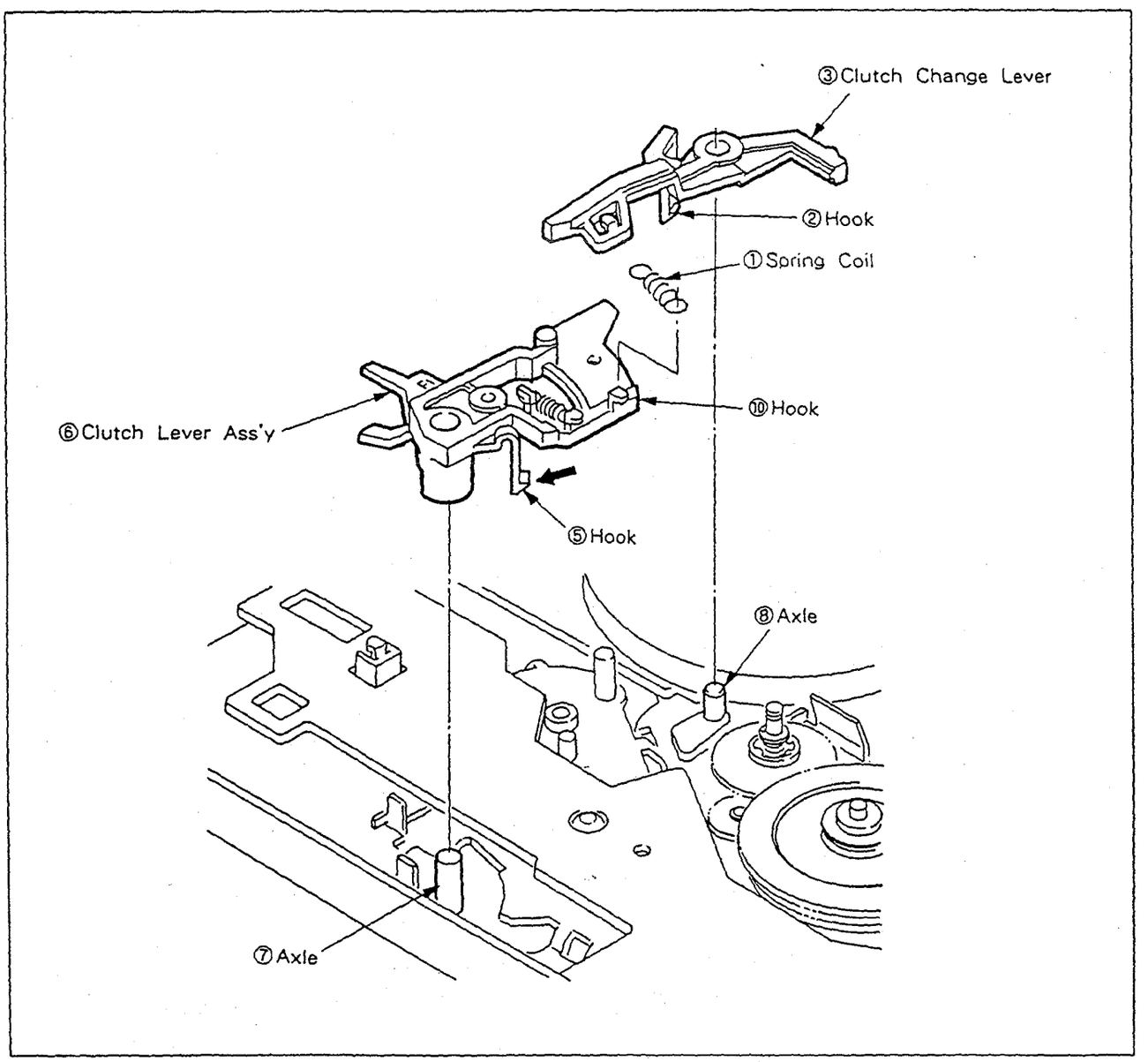


Fig. 5-8-6. Clutch Change Lever & Clutch Lever Ass'y

5-9. CAPSTAN MOTOR (See Fig. 5-9-1.)

1. Removal

1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.
2) Remove the CAPSTAN MOTOR ⑥ connector.
3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
2) Connect the CAPSTAN MOTOR ⑥ connector.
3) Mount the TOP BOARD ③ with the two screws ④.
4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 5-7-4.

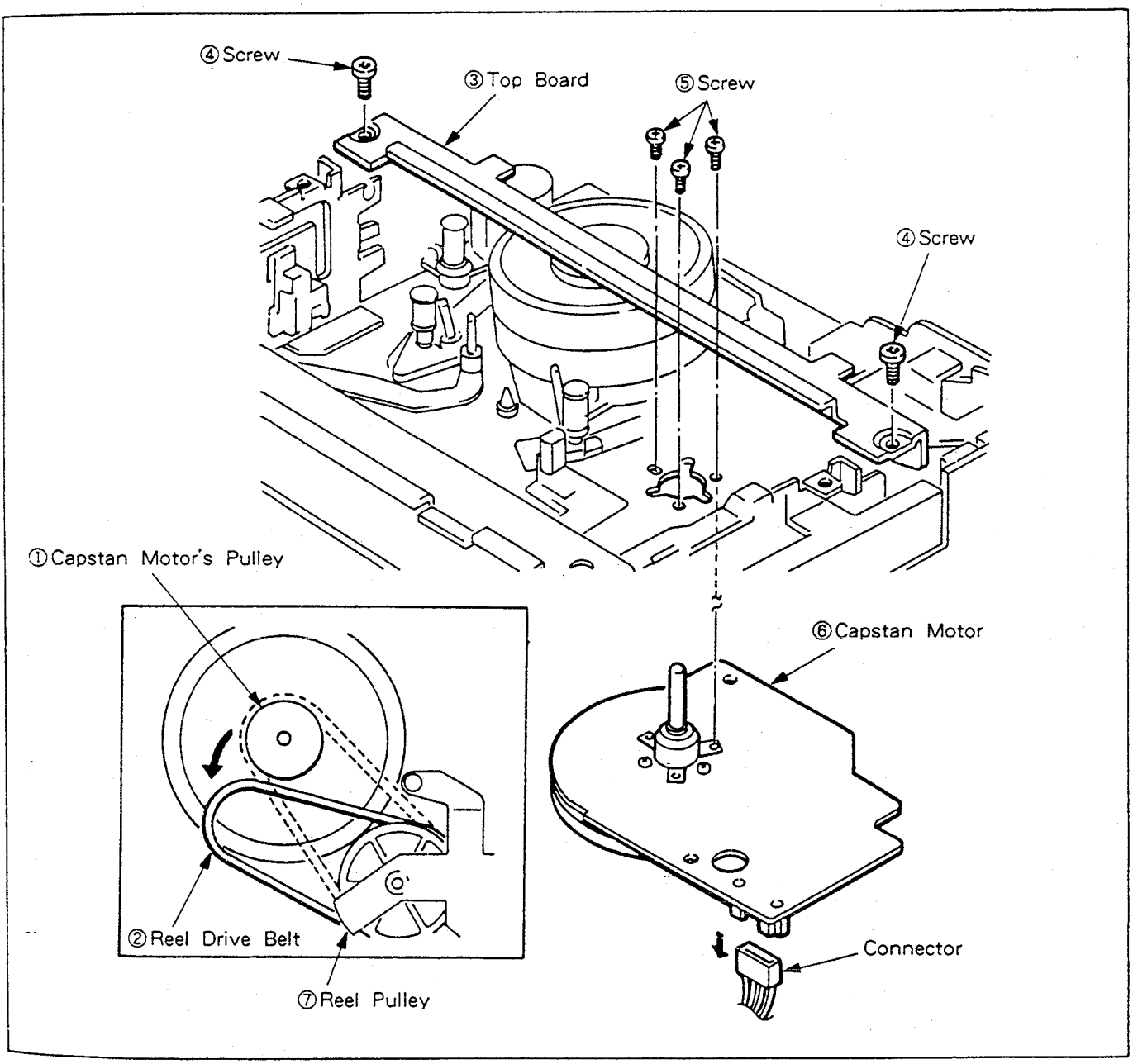


Fig. 5-9-1. Capstan Motor

5-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

(The IMPEDANCE ROLLER is not used on this model)

5-10-1. S-Side Fixed Guide and FE Lever Ass'y (See Fig. 5-10-1.)

1. Removal

1) Remove the special nut ①, then remove the GUIDE PIPE ③ and the special washer ② (lower), in that order.
2) Remove the SPRING COIL ⑤.
3) Remove the FTE HEAD connector, then remove the FE HEAD LEVER ASS'Y ⑦.

2. Remounting

1) Mount the FE LEVER ASS'Y ⑦ onto the axle ⑧.
2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
3) Mount the special washer ② (lower), the GUIDE pipe ③ and the special nut ① to the axle ⑧, in that order. At that time, do not excessively tighten the special nut ① to avoid idle rotation of the axle rivet. The height of fixing guide on the inlet side is not required.
4) Connect the connector to the FTE HEAD.

Note: Some models do not have the impedance roller.

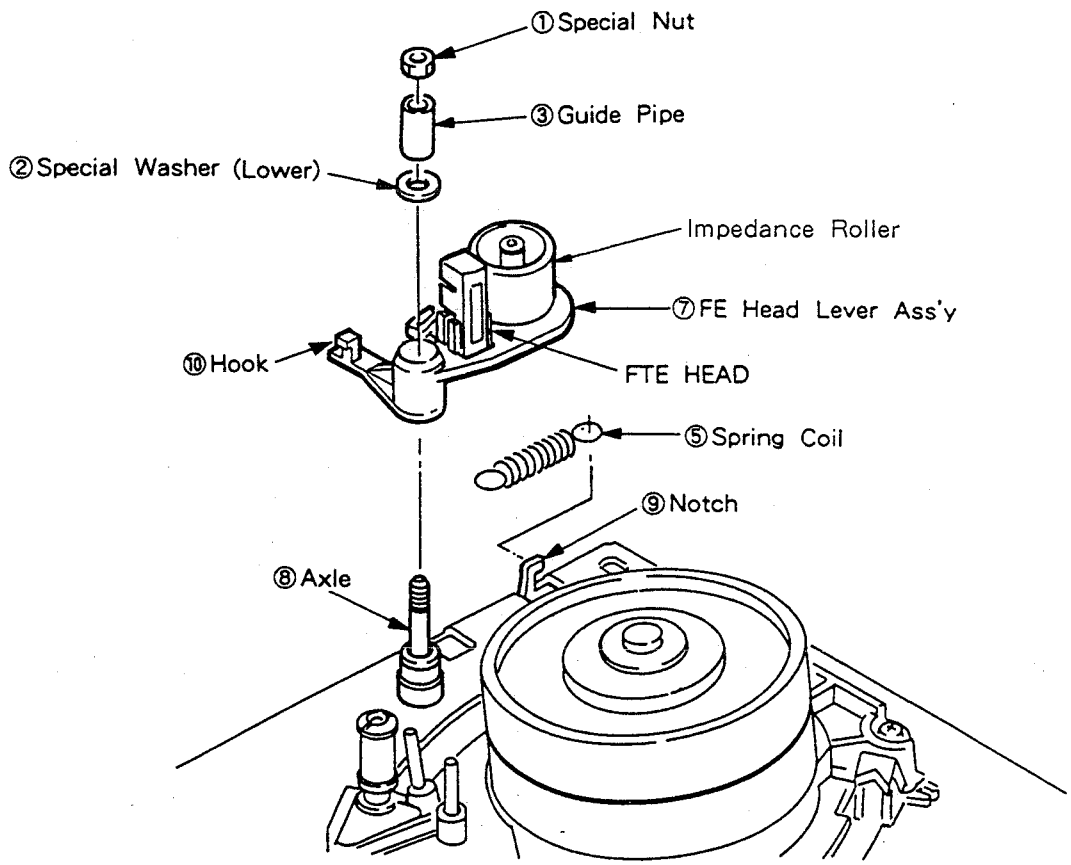


Fig. 5-10-1. Fixed Guide (S) & FE Lever Ass'y

5-10-2. Impedance Rolly, FTE Head (See Fig. 5-10-2.)

(The IMPEDANCE ROLLER is not used on this model)

1. **Removal**

1) Remove the FTE HEAD (full track erase head) ① connector.
2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. **Remounting**

1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
3) Connect the connector to the terminal of the FTE HEAD ①.

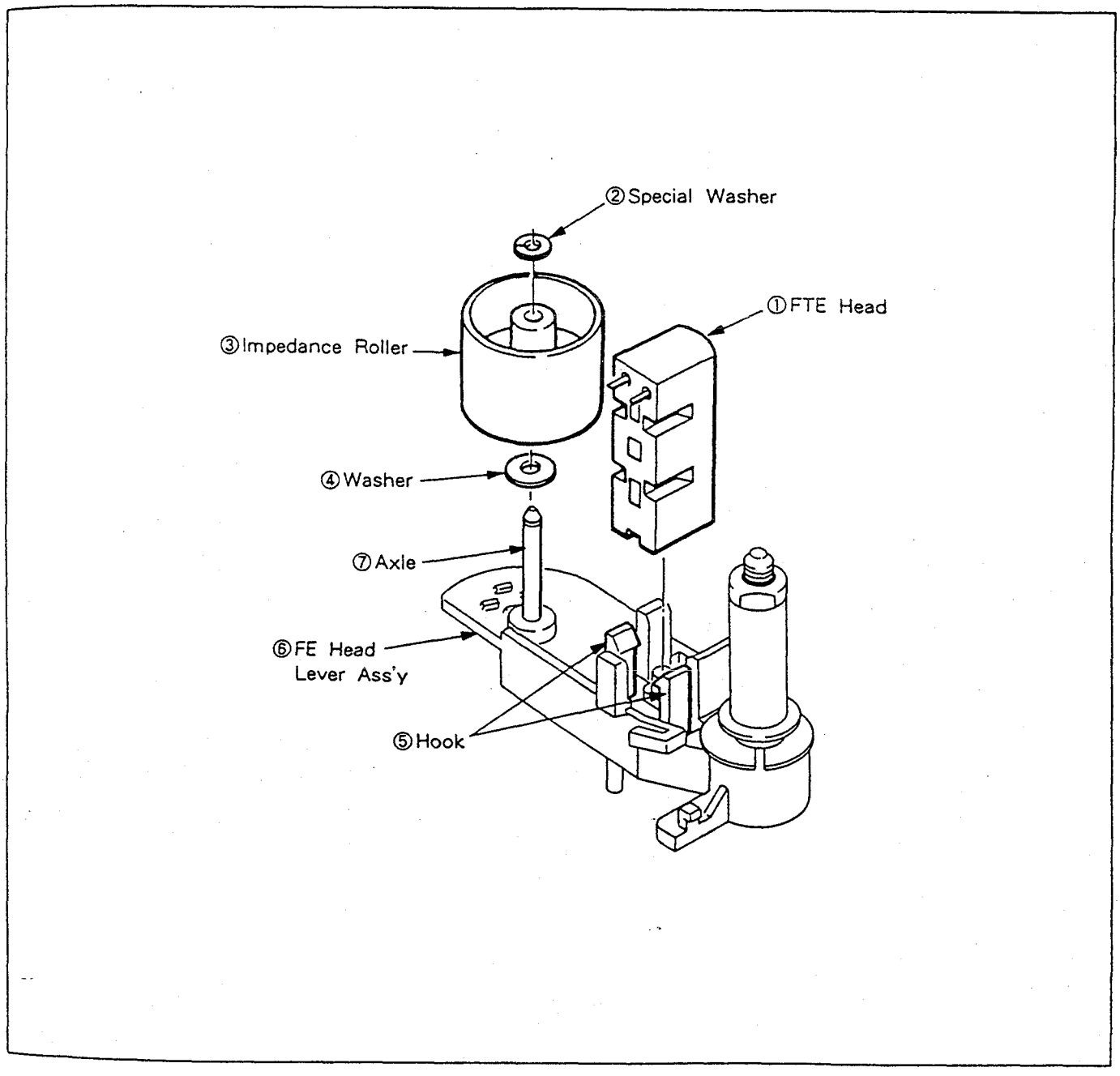


Fig. 5-10-2. Impedance Roller & FTE Head

5-10-3. Exit side Fixed Guide (See Fig. 5-10-3.)

1. Removal

1) Remove the CAP ①.
2) Remove the special NUT ②, then remove the special washer ③ (upper), the GUIDE PIPE ④, the special washer ③ (lower) and the sleeve ⑤, in that order.

2. Remounting

1) Mount the sleeve ⑤, the special washer ③ (lower), the GUIDE PIPE ④, the special washer ③ (upper) and the special NUT ②, in that order, to the axle ⑥.
2) Mount the CAP ① onto the axle ⑥.

Note: There is no need of height adjustment of the exit side fixed guide.

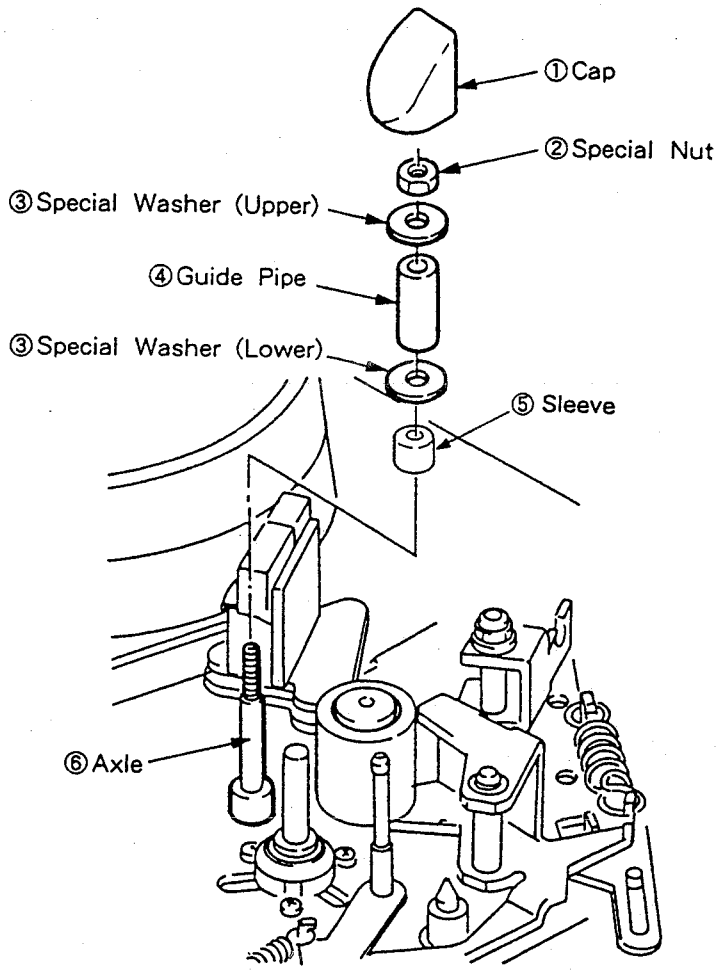


Fig. 5-10-3. Fixed Guide (T)

5-11. DRUM SECTION

5-11-1. Drum Motor (rotor, stator) (See Fig. 5-11-1.)

1. Removal

1) Referring to 5-4-1, remove the special washer and the LOAD RACK.
2) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
3) Remove the two screws ③, then remove the ROTOR ④ and SPACER.
4) Remove the STATOR board connector ⑩.
5) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

1) Mount the STATOR ⑥ with the three screws ⑤.
2) Mount the SPACER ⑪ on to the AXLE ⑫.
3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
4) Insert the connector ⑩.
5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.
6) Referring to 5-4-1 attach the LOAD RACK and the special washer. It is needed that the LOAD RACK is to be set correctly to the LOAD GEAR T.

Note 1: Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3 kg-cm.

Note 2: When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

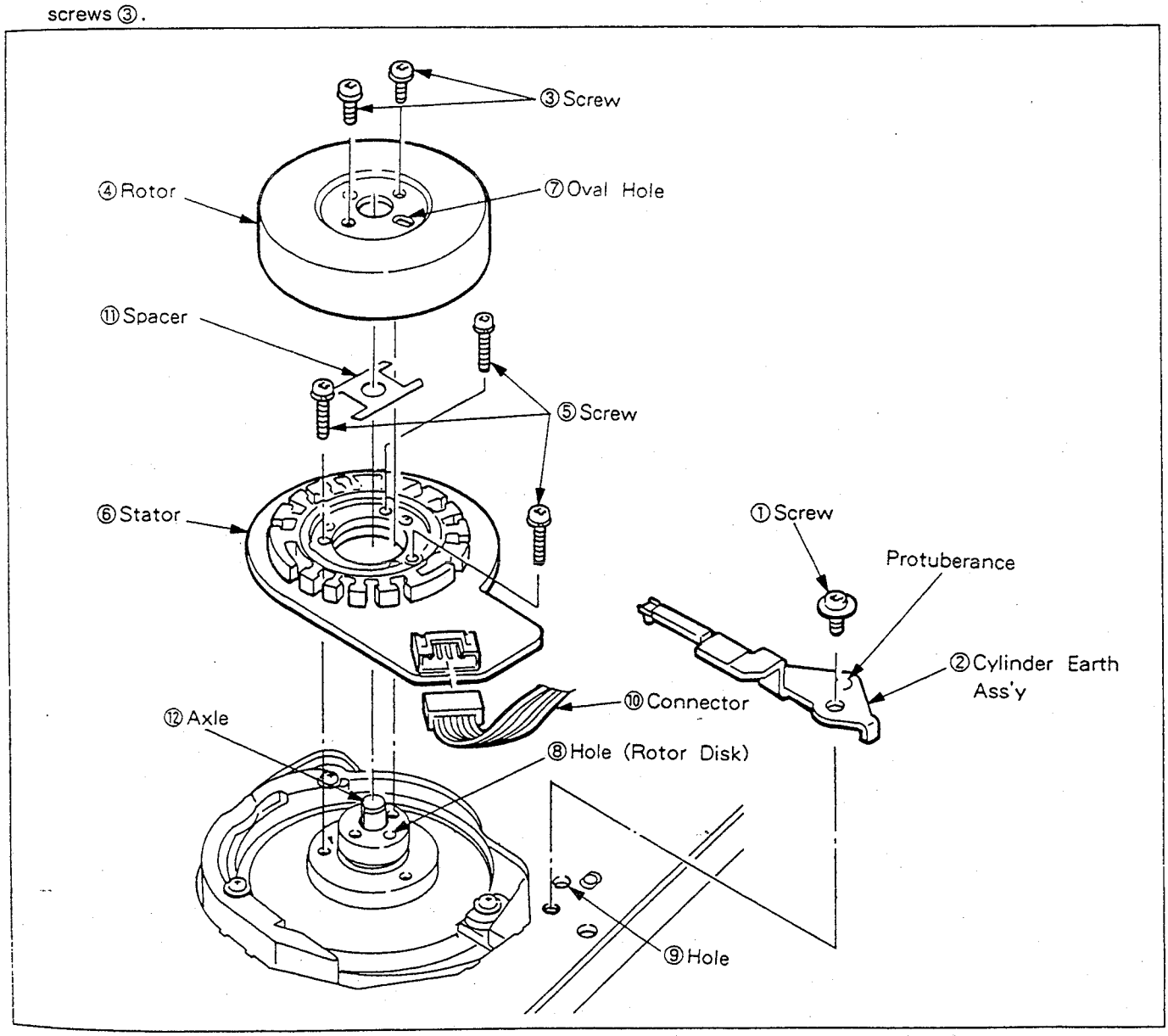


Fig. 5-11-1. Drum Motor

5-11-2. Drum Unit (See Fig. 5-11-2.)

1. Removal

1) For some models with the board located above the upper drum, remove the board.
2) Remove the flexible P.C.B. ① from the PRE-AMP UNIT (take care not to pull the flexible P.C.B. in the upward direction).
3) Remove the LOAD RACK only, as instructed in 5-4-1.
4) Remove the three screws ②, then remove the drum unit ③.

NOTE : When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
2) Mount the ROAD RACK as instructed in 5-4-1.
3) Insert the flexible P.C.B. into the PRE-AMP UNIT.
4) Clean the drum unit.
5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.

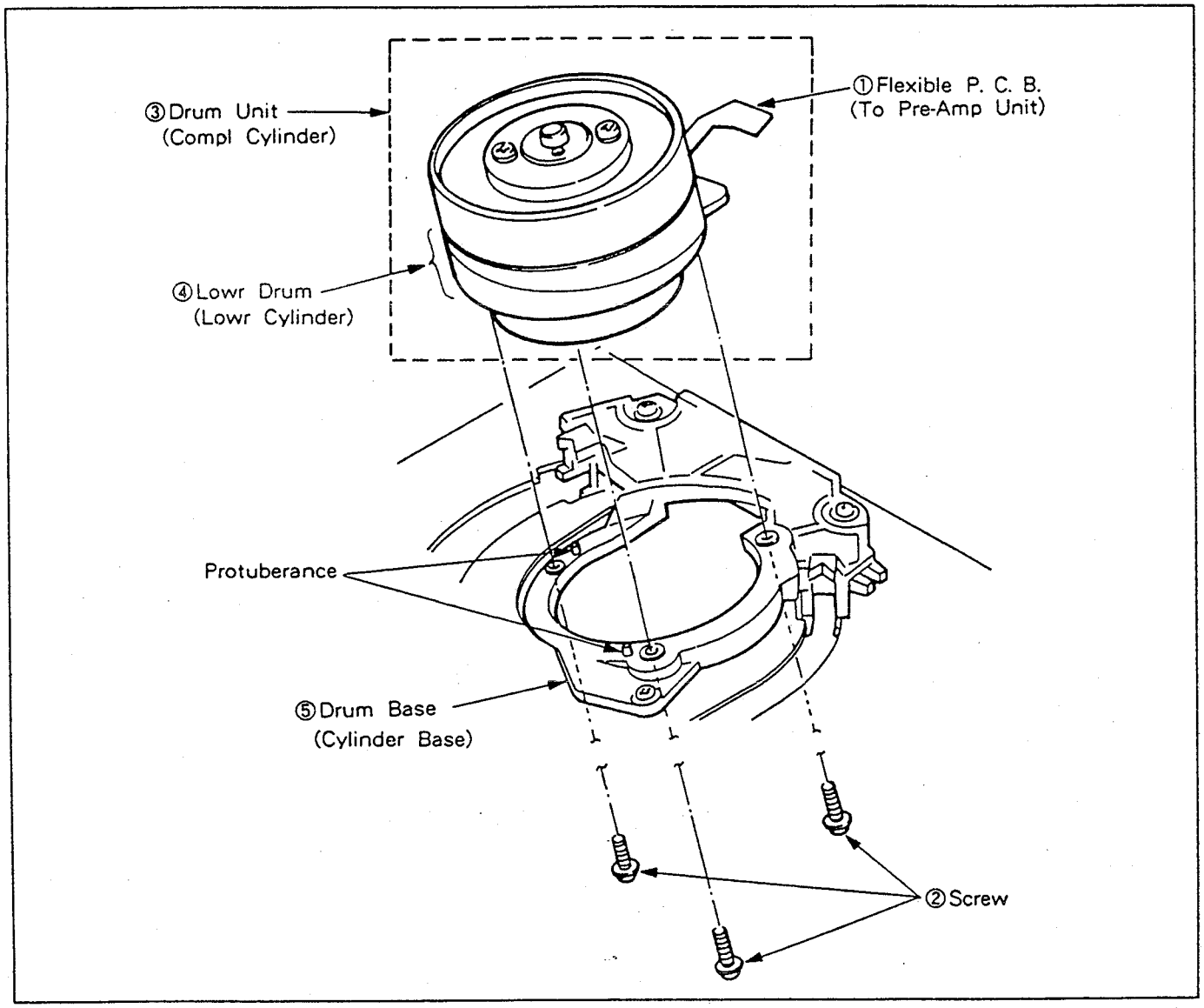


Fig. 5-11-2 Drum Unit (Compl Cylinder)

5-11-3. Upper Drum (Upper Cylinder)

1. Removal

1) Remove the two screws ① (see Fig. 5-11-3).
2) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum (UPPER CYLINDER), remove the lead wires soldered from the P.C. board (see Fig. 5-11-4.).
3) Turn the head removing jig (VHJ-0041) handle ② counterclockwise to lift up the stopper ③ (see Fig. 5-11-5.).
4) Insert the two long screws ④ of the jig into the screw holes ⑥ located on the head chip side of the upper drum (UPPER CYLINDER) ⑤, then mount by turning the handle clockwise.
5) While holding the jig so that the upper drum ⑤ does not rotate, turn the handle ② clockwise to remove the upper drum.
6) Remove the jig from the upper drum.

Note : Handle parts carefully to protect the drum from scratches and dirt, and the video head from damage.

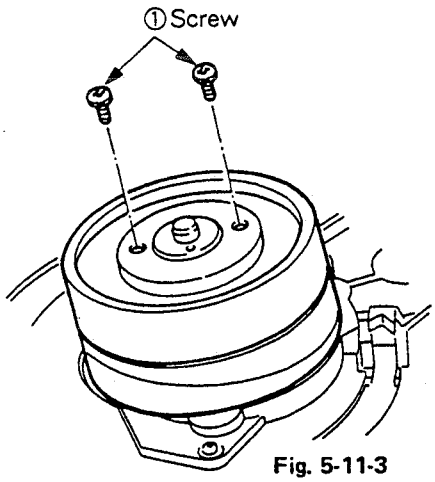


Fig. 5-11-3

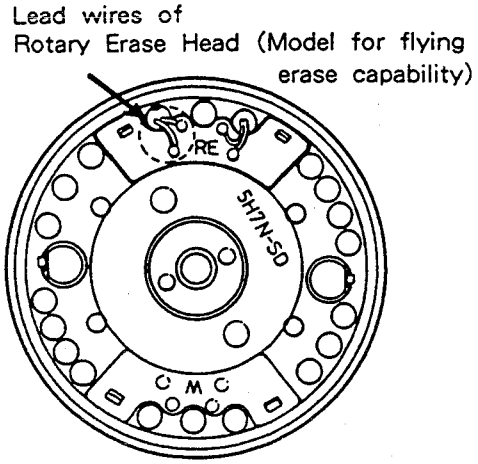


Fig. 5-11-4

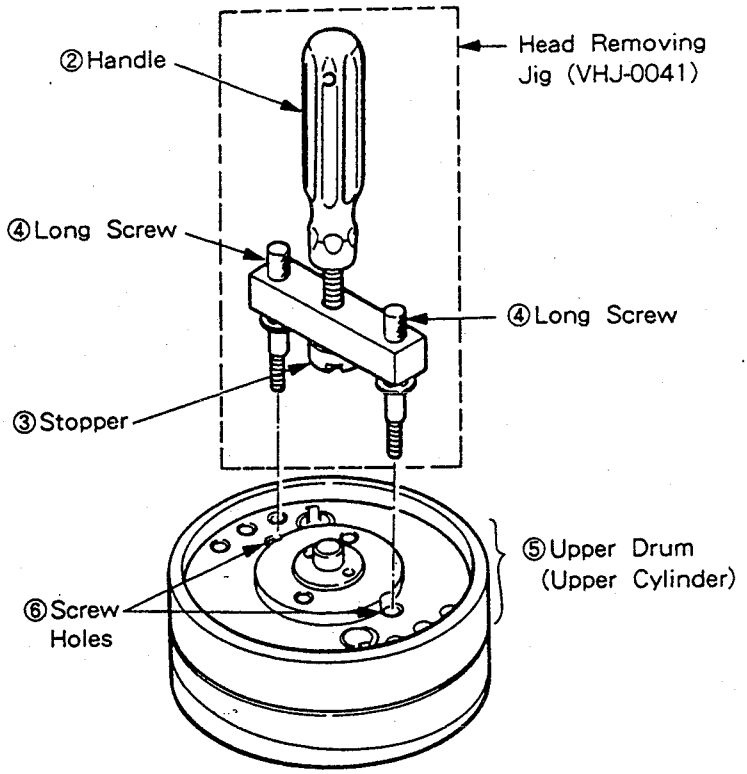


Fig. 5-11-5

2. Remounting (See Fig. 5-11-6.)

1) Confirm that surfaces where the flywheel and the upper drum (UPPER CYLINDER) are engaged or make contact portion are free from scratches and dirt.
2) The code name ① of the drum is printed on the video head side of the upper drum ⑤ SP CH-1 (channel A, plus azimuth). The code name ① is set with in the rotary transformer terminal round hole side ② position of lower drum (LOWER CYLINDER), so that the two screw holes ③ of the upper drum are aligned with the two screw holes ④ of the flywheel. (Refer to 3. Recognizing the SP CH-1 Head side).
3) In case the RE (ROTARY ERASE) HEAD is attached to the upper drum, pass the lead wires through the lead wire hole. (See Fig.5-11-4.)
4) While keeping the upper drum ⑤ parallel to the lower drum (LOWER CYLINDER) ⑧, insert it completely into the flywheel.
5) Temporarily tighten the two screws ⑦ alternately a little at a time, then tighten them to a torque of 6kg-cm using a torque driver (VHJ-0014) and a 3mm bit (VHJ-0045).
6) In case the RE head is attached to the upper drum ⑤, solder the lead wires to the P.C. board. Solder the red lead wire to the R terminal, and the yellow lead wire to the Y terminal.

Note : When the upper drum has been replaced, perform a tape path adjustment as instructed in 6-4. and CH-1/CH-2 switching position adjustment of the servo circuit.

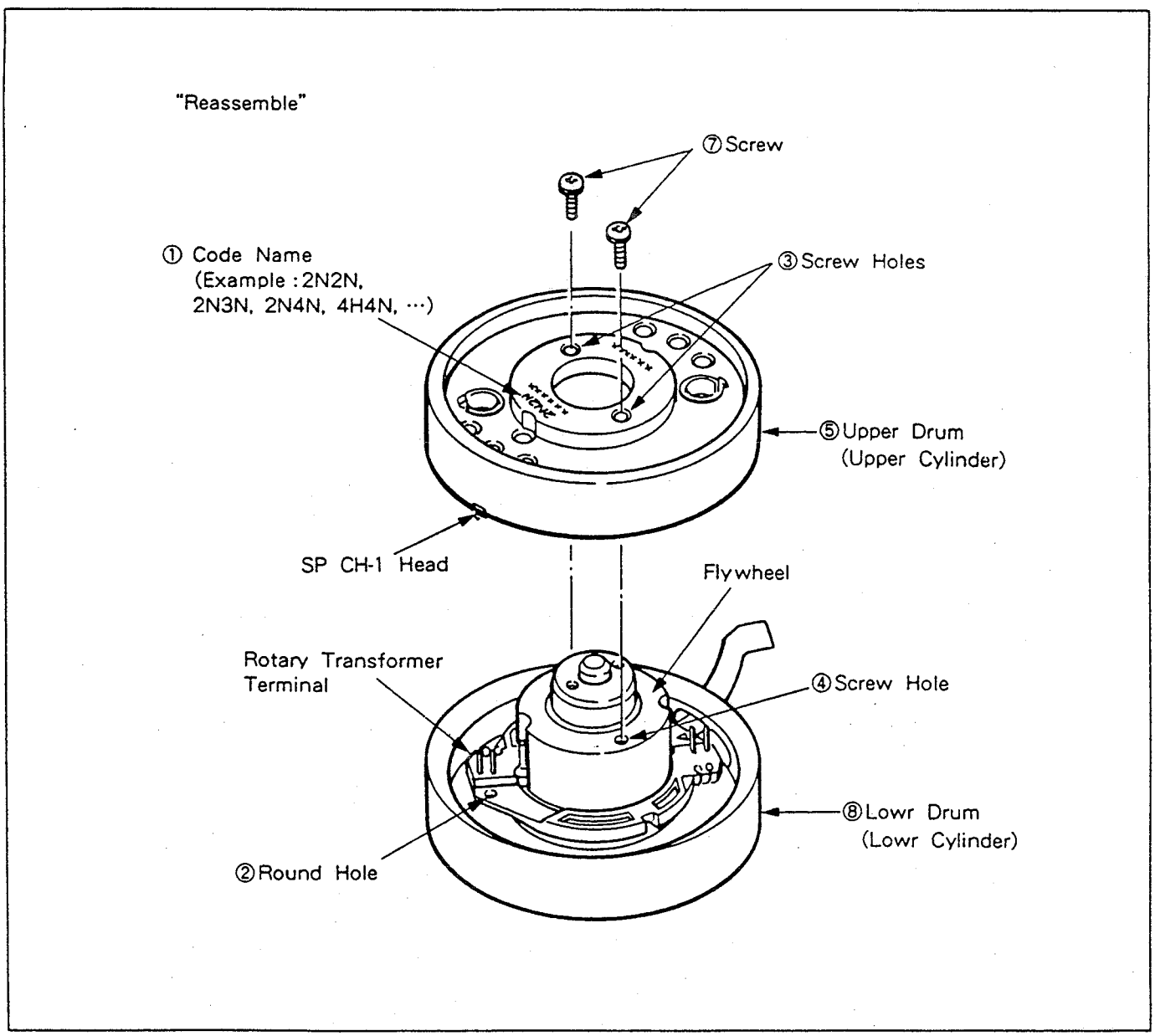
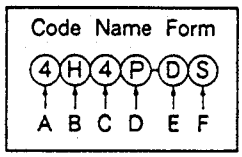


Fig. 5-11-6.

3. **Recognizing the SP CH-1 Head Side**
No playback picture can be obtained if the video head is not wired as a pair with the rotary transformer located inside the lower drum rotating section. Therefore, mounting position should be matched when mounting the upper drum. In the P90 mechanism series, the code name of the drum is printed on the SP CH-1 (CH-A, plus azimuth) side as a mark for mounting the upper drum. (See Fig. 5-11-7.) This code name differs according to the drum type, but its basic form is as follows :

A = Number of head bases
B = "N" for normal audio
"H" for HI-FI audio
C = Number of heads
D = TV system ("N" or "P")
EF = Code for detailed classification. Depending on drum type, it can also be just one character, or a blank space.



Examples of Detailed Classification Codes
V = Head with level difference
D = Compatible with digital units
S = SVHS-compatible

Examples of Code Names
2N2P, 2N2P-L, 2N2P-V, 2N2P-D, 2N3P, 2N4P, 4H4P, 4H4P-D

Moreover, there is a round hole with marking purposes on the SP CH-1 (CH-A, plus azimuth) side of the lower drum rotary transformer terminal. As shown in Fig. 5-11-8, there are two types of rotary transformer terminals (the number of pins differs according to the number of heads).

Note : When ordering parts such as drums (CYLINDERS), do not use the code names ; always refer to the parts list and order with the specified part numbers.

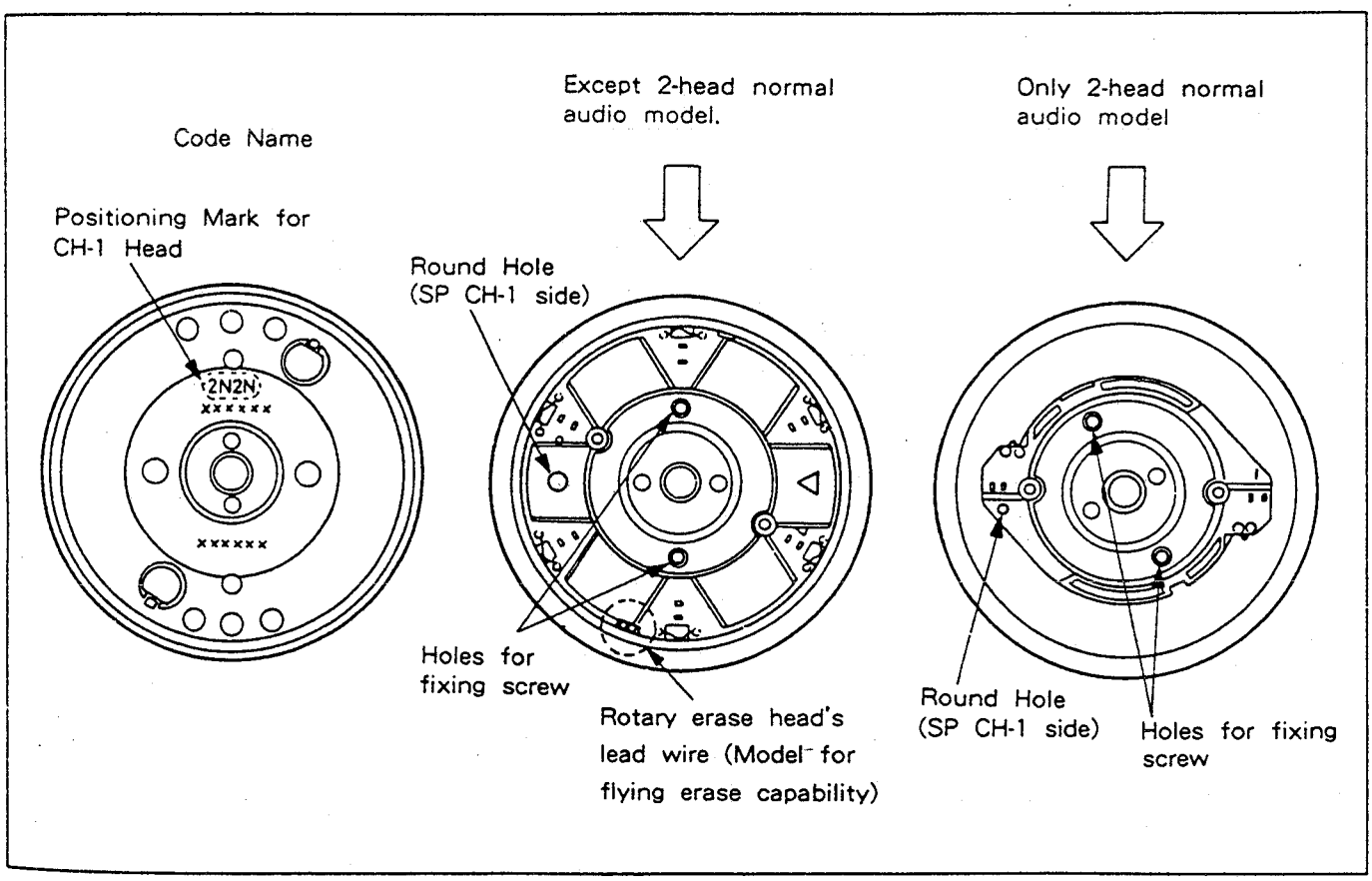
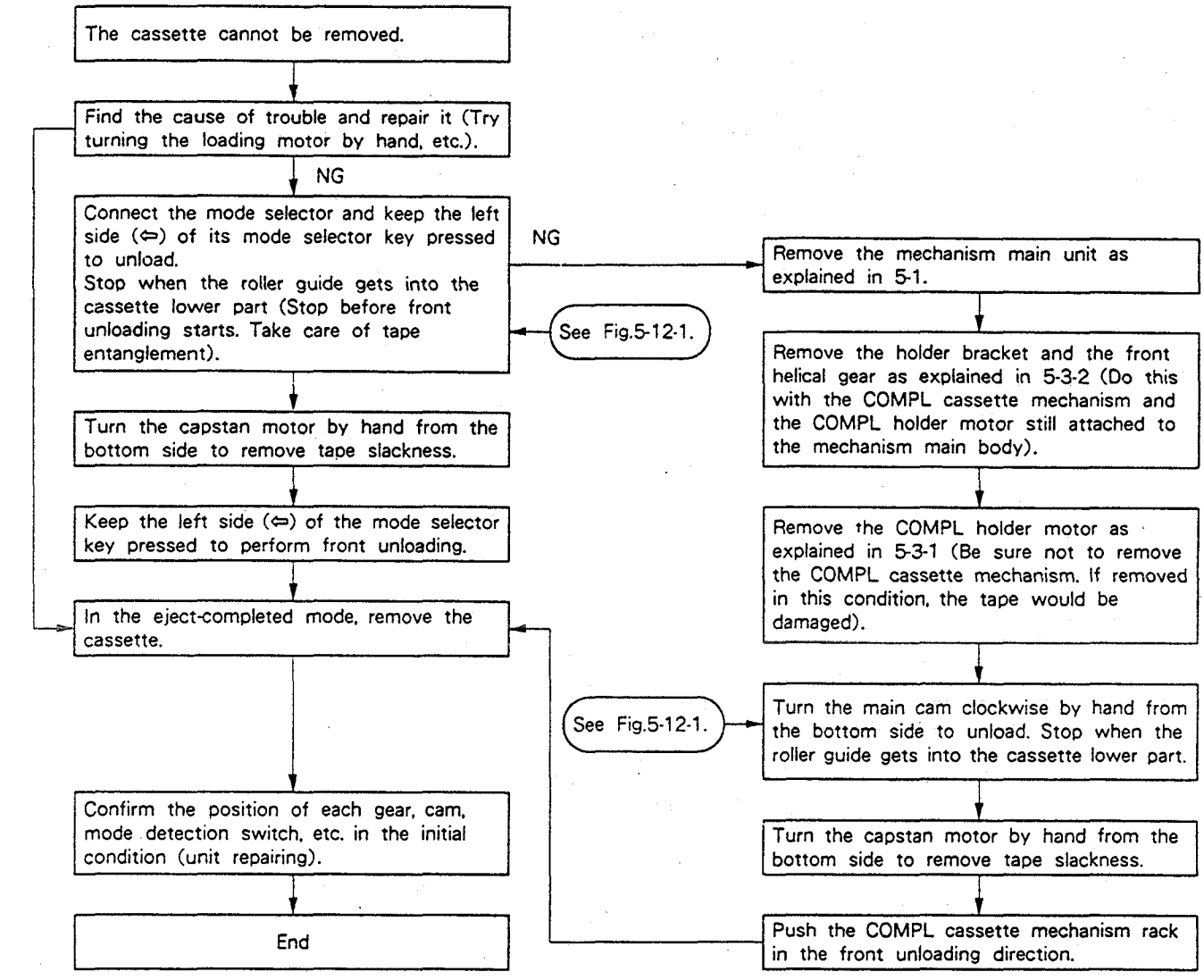

Code Name
Positioning Mark for CH-1 Head
2N2N
Except 2-head normal audio model.
Round Hole (SP CH-1 side)
Holes for fixing screw
Rotary erase head's lead wire (Model for flying erase capability)
Only 2-head normal audio model
Round Hole (SP CH-1 side)
Holes for fixing screw

Fig. 5-11-7. Upper Drum

Fig. 5-11-8. Lower Drum

5-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED


The cassette cannot be removed.
Find the cause of trouble and repair it (Try turning the loading motor by hand, etc.).
NG
Connect the mode selector and keep the left side (⇦) of its mode selector key pressed to unload.
Stop when the roller guide gets into the cassette lower part (Stop before front unloading starts. Take care of tape entanglement).
NG
See Fig.5-12-1.
Turn the capstan motor by hand from the bottom side to remove tape slackness.
Keep the left side (⇦) of the mode selector key pressed to perform front unloading.
In the eject-completed mode, remove the cassette.
Confirm the position of each gear, cam, mode detection switch, etc. in the initial condition (unit repairing).
End
Remove the mechanism main unit as explained in 5-1.
Remove the holder bracket and the front helical gear as explained in 5-3-2 (Do this with the COMPL cassette mechanism and the COMPL holder motor still attached to the mechanism main body).
Remove the COMPL holder motor as explained in 5-3-1 (Be sure not to remove the COMPL cassette mechanism. If removed in this condition, the tape would be damaged).
See Fig.5-12-1.
Turn the main cam clockwise by hand from the bottom side to unload. Stop when the roller guide gets into the cassette lower part.
Turn the capstan motor by hand from the bottom side to remove tape slackness.
Push the COMPL cassette mechanism rack in the front unloading direction.

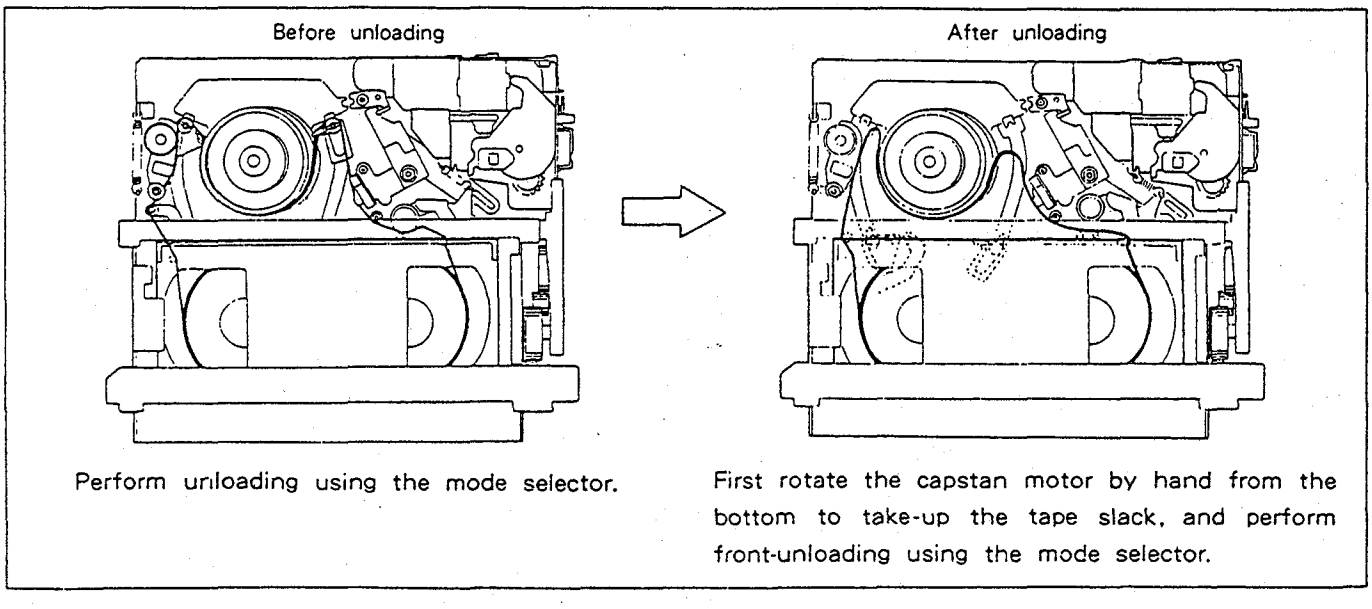

Before unloading
After unloading
Perform unloading using the mode selector.
First rotate the capstan motor by hand from the bottom to take-up the tape slack, and perform front-unloading using the mode selector.

Fig. 5-12-1

5-13. AUTO HEAD CLEANER MECHANISM (See. Fig. 5-13-1 • Fig. 5-13-2 • Fig. 5-13-3)

1. Removal

Note: • Do not hold the ROLLER CLEANER ASS'Y ① by bare hand. Use tweezers and gloves not soiled with grease or dust, etc.
• When the cleaning function deteriorates and replacing only ROLLER CLEANER ASS'Y ①, there is no need to perform item 4).

1) Make sure that the ROLLER CLEANER ASS'Y ① is not pressed against a drum (cylinder).
2) Remove the PRE-AMP UNIT and the PRE-AMP BRACKET.
3) Remove screw ②, then lift up and remove the BRACKET CLEANER ASS'Y ③.
4) With the BRACKET CLEANER ASS'Y ③ is fixed by finger, turn the LEVER CLEANER ASS'Y ④ 35° to 40° to clockwise, then lift up and remove.
5) Remove the stop washer ⑤, then remove the ROLLER CLEANER ASS'Y ①.

2. Remounting

1) Mount the ROLLER CLEANER ASS'Y ① and the stop washer ⑤ to the axle ⑥ of LEVER CLEANER ASS'Y.
   Mount the ROLLER CLEANER ASS'Y ① so that the mark shown in Fig. 5-13-2 is up side. If the mark is down side, noise may occur.
2) Mount the SPRING COIL ⑧ and the LEVER CLEANER ASS'Y ④ to the axle ⑦ of BRACKET CLEANER ASS'Y. At this time, hook the SPRING COIL ⑧ to the hole ⑨ of the LEVER CLEANER ASS'Y and the bent part ⑩ of the BRACKET CLEANER ASS'Y. "A part" of the LEVER CLEANER ASS'Y should be under "B part" of the BRACKET CLEANER ASS'Y.
3) Fix the BRACKET CLEANER ASS'Y ③ on screw hole ⑫ by screw ②. Before fasten screw ②, insert hole ⑪ of the BRACKET CLEANER ASS'Y to axle ⑯, axle ⑦ to hole ⑬ to match positions. Pin ⑭ of the LEVER CLEANER ASS'Y should be run along the circumference of the MAIN CAM ⑮ not to be came off.
4) The upper side of the lower drum should be within approx. 2mm from the lower side of the ROLLER CLEANER ASS'Y as shown in Fig. 5-13-3.
5) Mount the PRE-AMP BRACKET and the PRE-AMP UNIT.

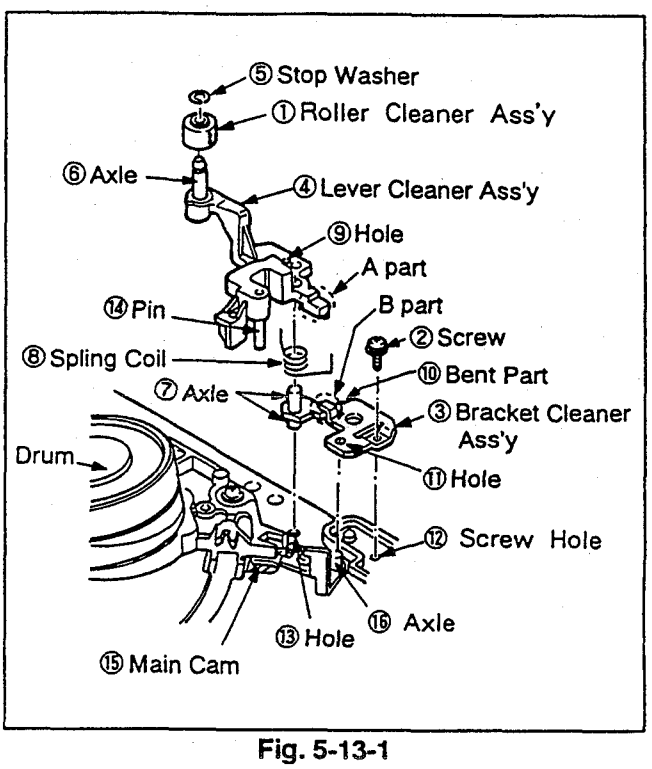


Fig. 5-13-1

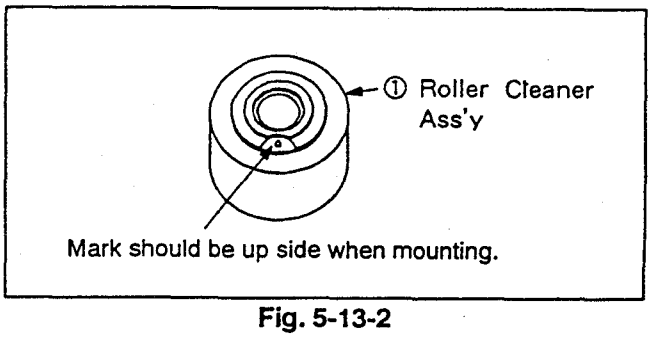


Fig. 5-13-2

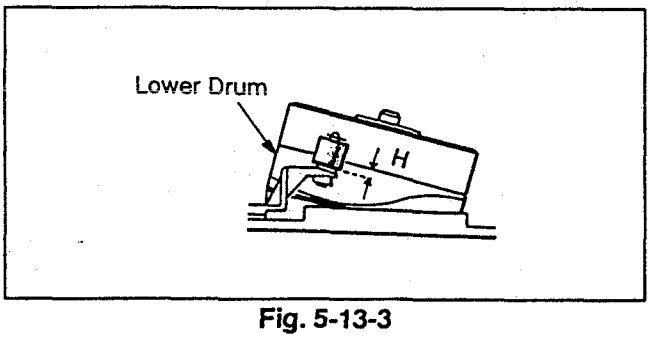


Fig. 5-13-3

SECTION 6
MECHANISM ADJUSTMENTS

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode : Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.

REW/R-SEARCH : After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

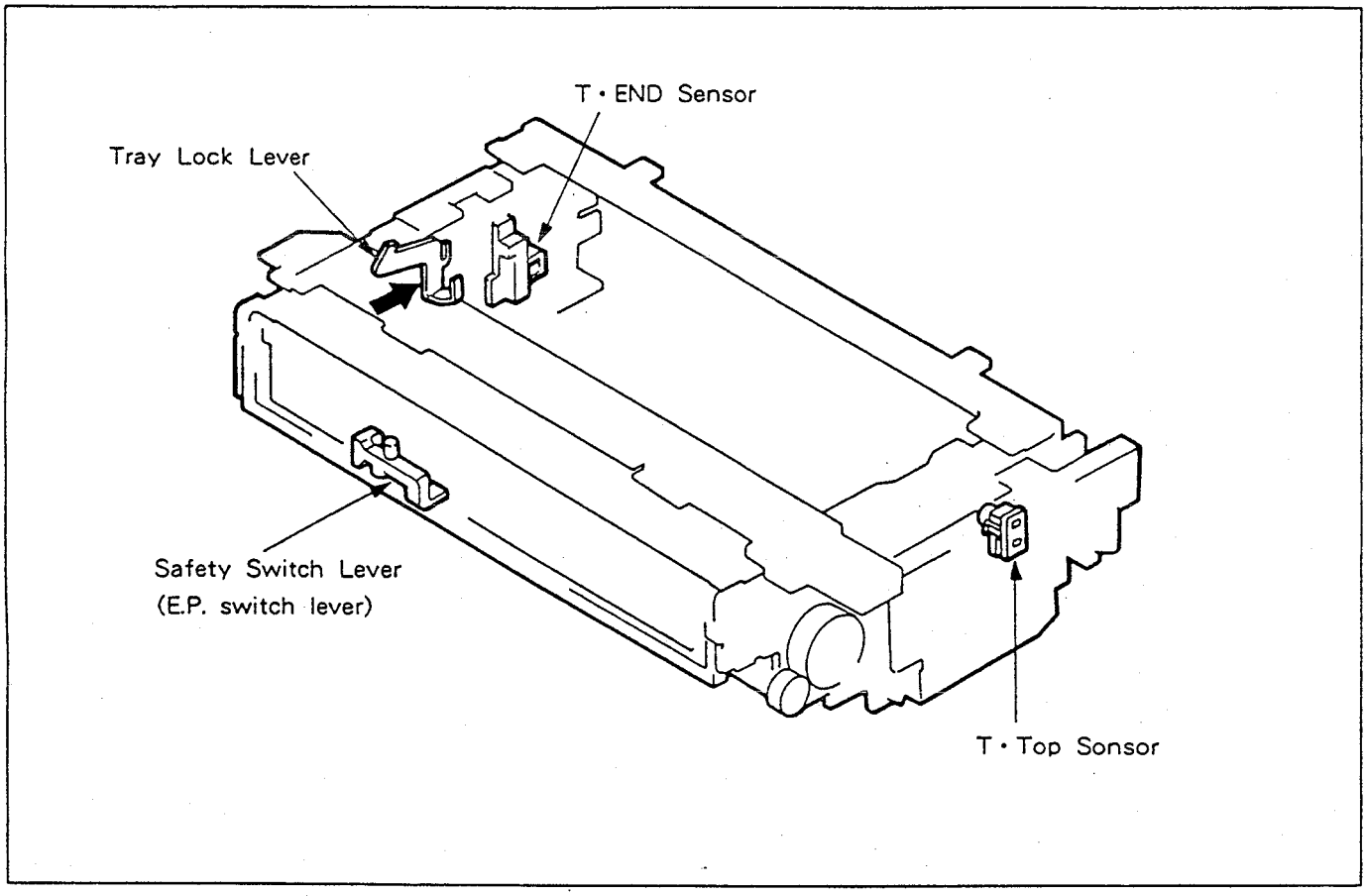


Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is raplaced, it will be necessary to adjust the REEL TABLE height.

(1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
(2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
(3) Confirm that, when the gauge stops, the REEL TABLEs are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
(4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
(5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
(6) Remove the master plane.
(7) Set the EJECT mode with the mode selector.
(8) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.

Note:

- Adjust the reel table height by adding or removing spacers(0.13t, 0.25t, 0.3t, 0.4t and 0.5t)as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
  (The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

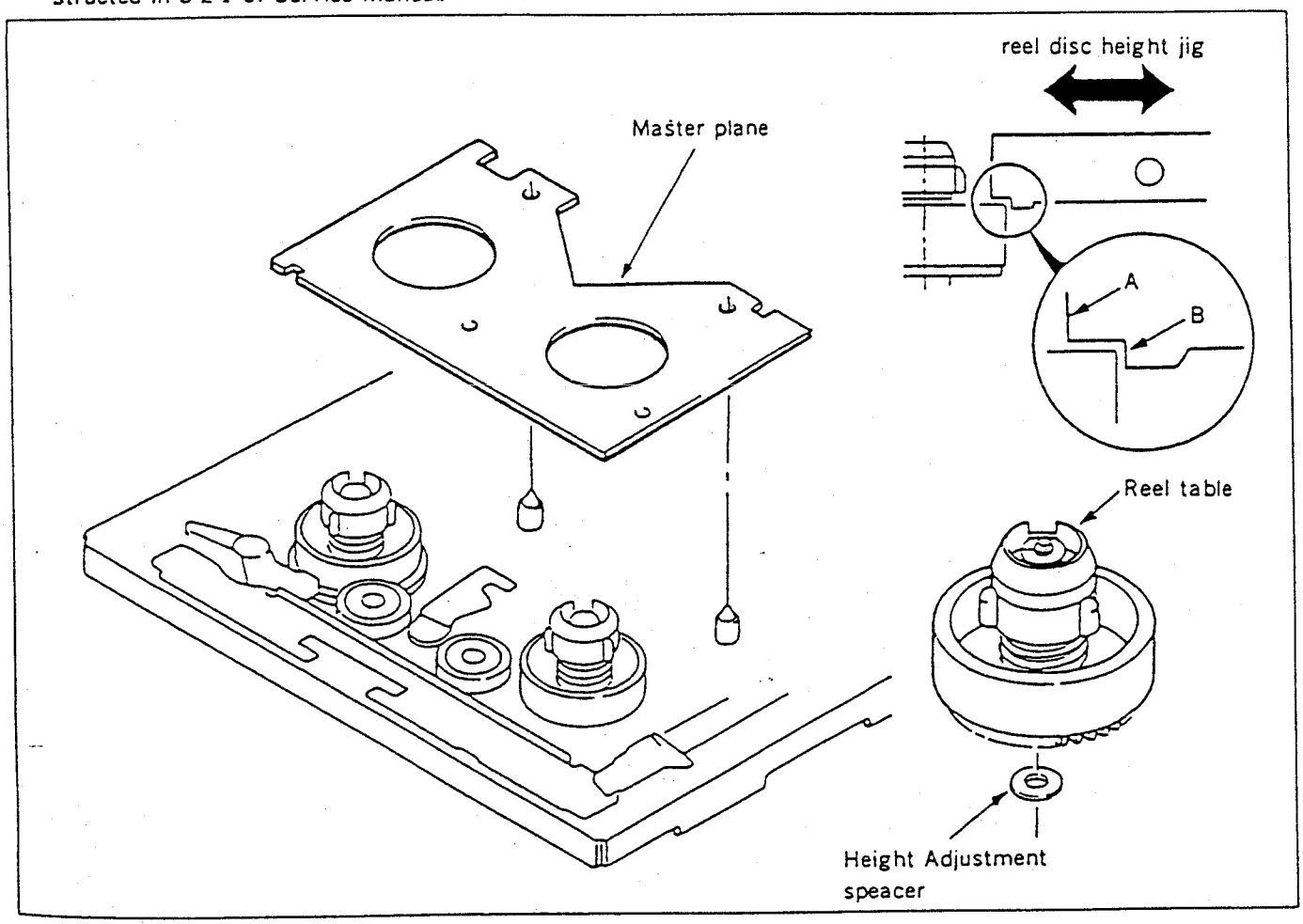


Fig. 6-2-1. Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 80 through 140gcm (locked torque).
5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
6) After confirming that torque readings are within the specifications for each mode, check the following :
   ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
   ⓑ Deterioration of the REEL DRIVE BELT.
   ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
   ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1 : Items ⓑ, ⓒ and ⓓ require replacement if found defective.

Note2 : The measured value of torque during FF and REW represents the value 2 seconds after starting.

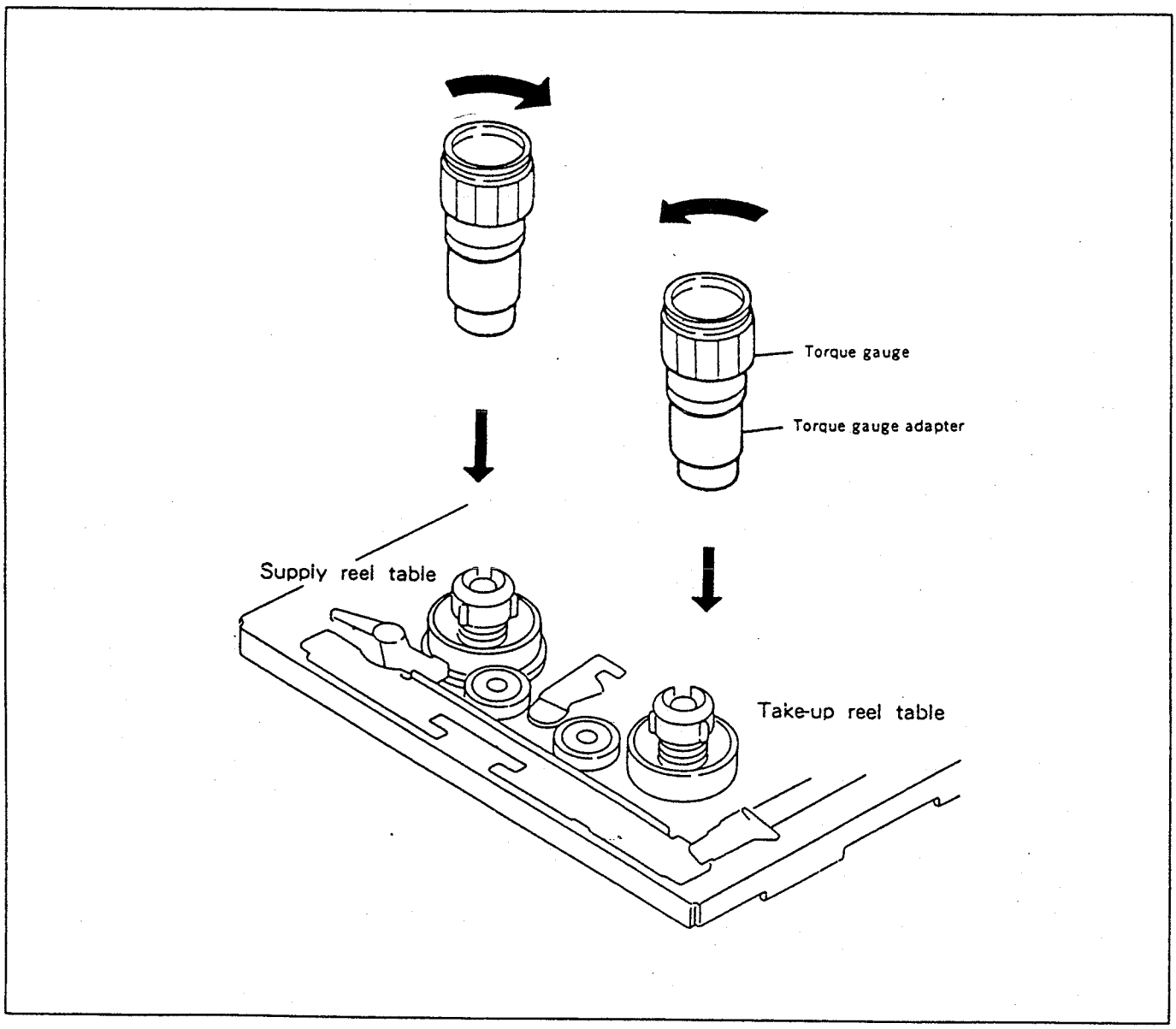


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

1) Remove the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
2) Set the PLAY mode with the mode selector (VHJ-0050)
3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
4) In case the tension pole is not withim 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow Ⓐ.
5) Set the EJECT mode with the mode selector.
6) Mount the COMPL CASSETTE MECHANISM as instructed in 5-2-1 of Service Manual.
7) Confirm that back tension torque is within 42± 5gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torque Chack (See Fig. 6-3-1.)

1) Attach the cassette torquemeter (VHT-063S) and set the PLAY mode.
2) Confirm that back tension torque is within 50 ± 10gcm.
3) In case back tension torque dose not meet the above specification, proceed as follows:

ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.

ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 5-7-3 of Service Manual.

ⓒ Raplace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note : Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing ⓐ, ⓑ and ⓒ.

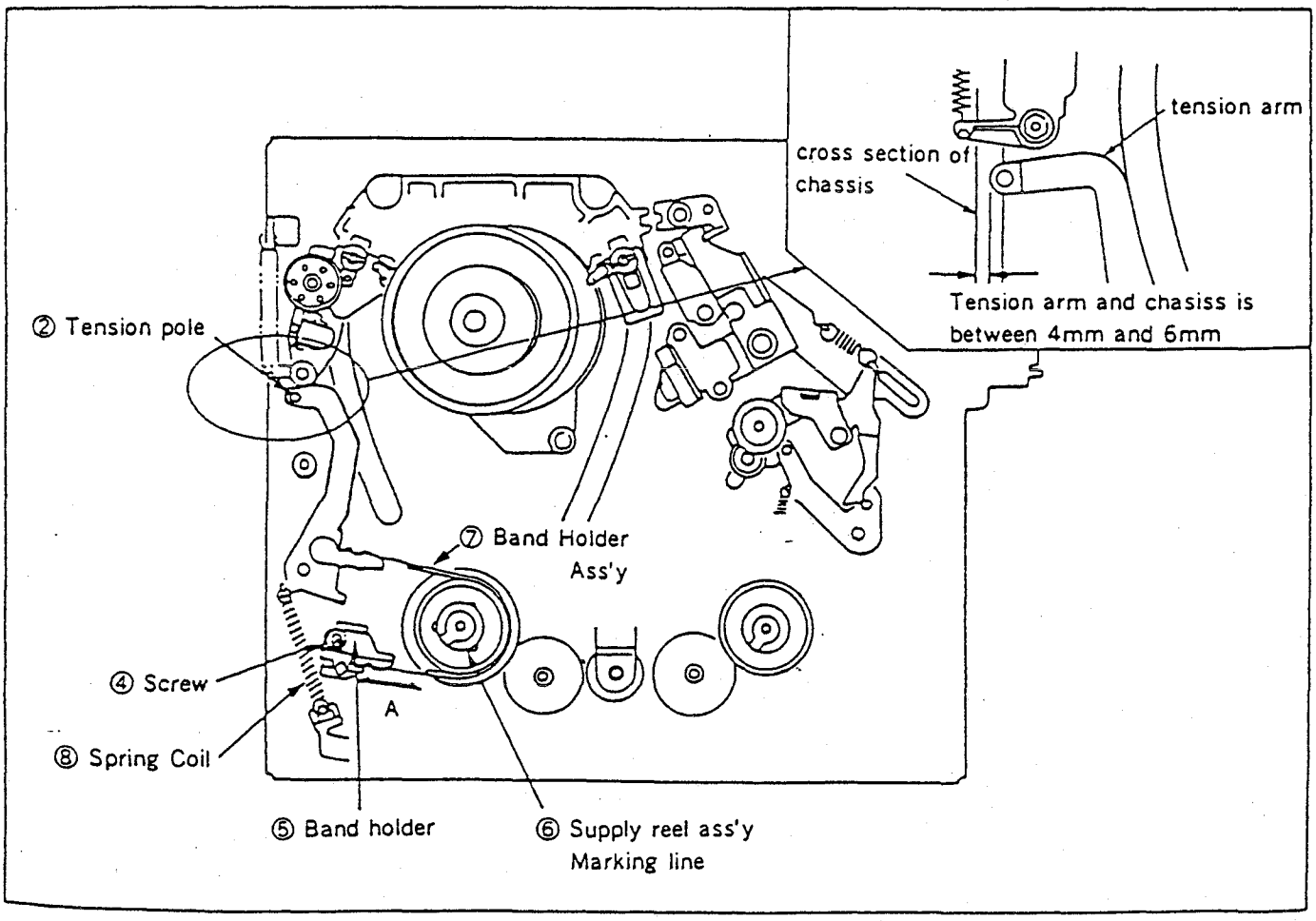


Fig. 6-3-1. Tension Pole Positioning Adjustment

6-4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use.
This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.
Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

(1) Clean the tape transport surfaces (See Fig. 6-4-1.).
(2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW30 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW30 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note : Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

(3) Use a dentist's mirror for visual observation of tape path condition.
(4) Use an eccentric driver (VHJ - 0003) for adjustment of the guide rollers.
(5) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.
(6) Do not use the damaged cassette tapes for tape path adjustment.

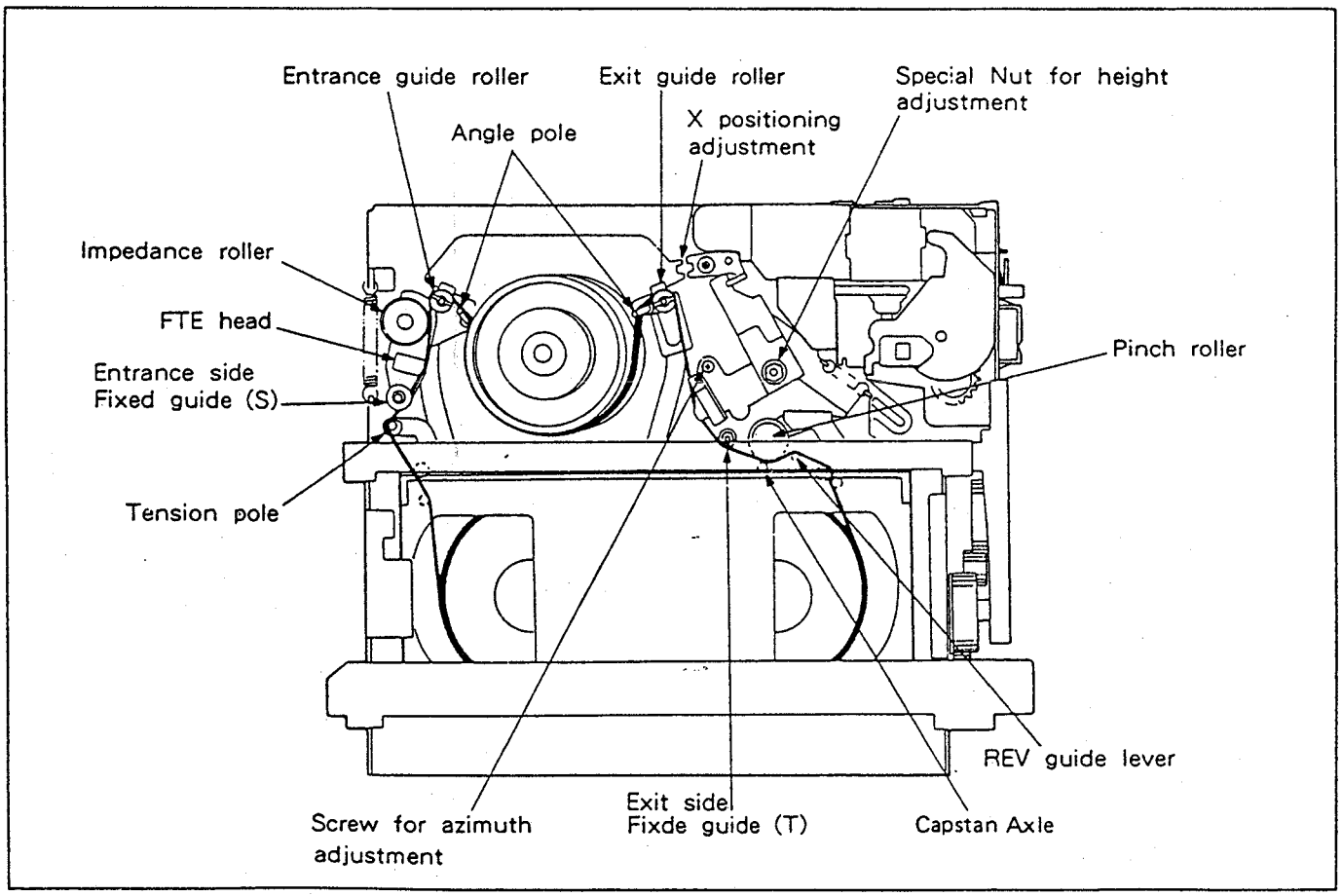


Fig. 6-4-1. Preparation for Adjustment

6-4-2. Adjustment by Visual Observation after Guide Roller, COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (MH-2) beforehand and adjust height by visual observation.

(1) Guide Rollers (See Fig. 6-4-3.)
The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.

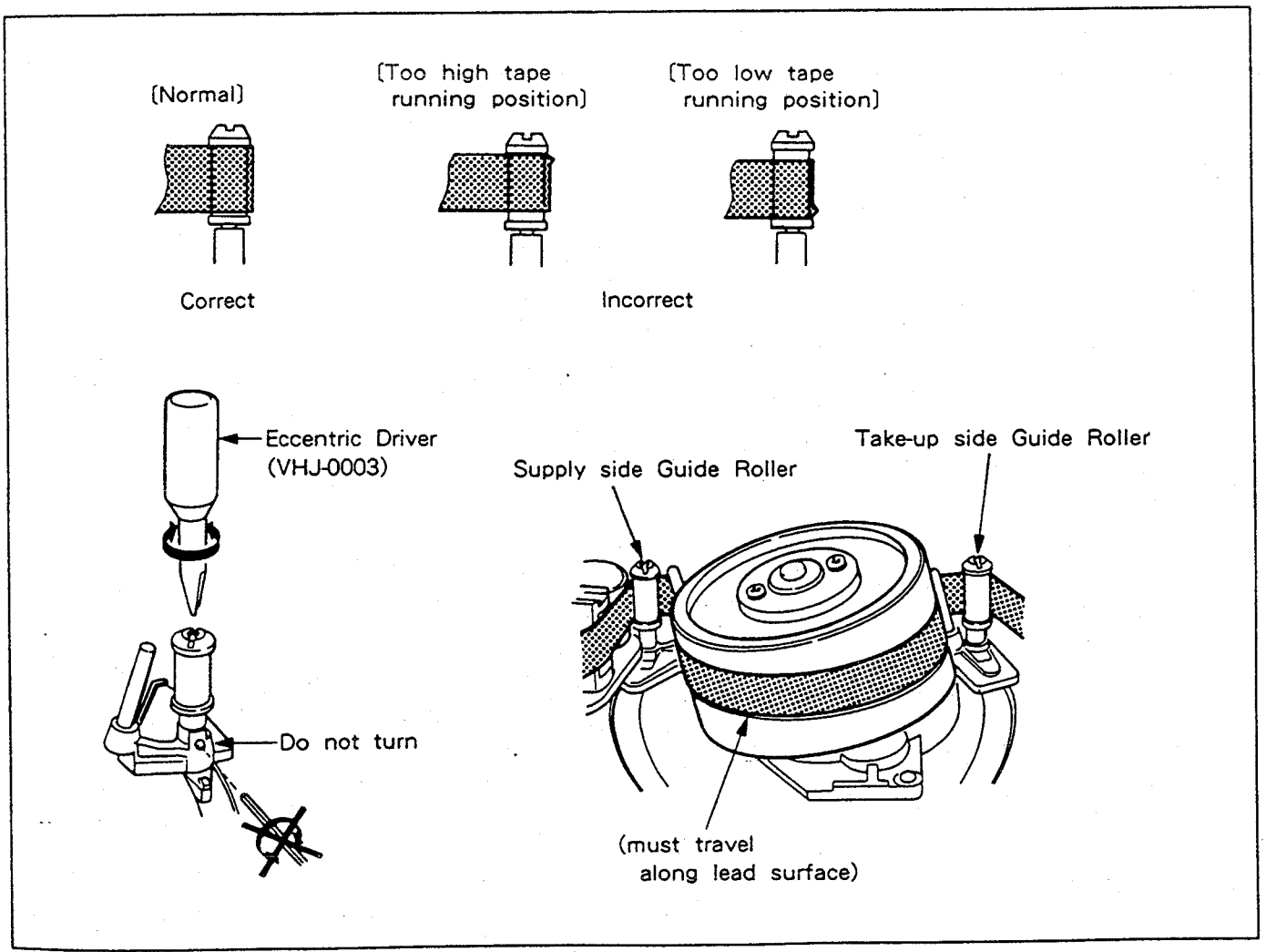


Fig. 6-4-2. (2) Pre-set for Guide Roller

(2) COMPL Head Bracket (ACE Head) (See Fig. 6-4-3.)
Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

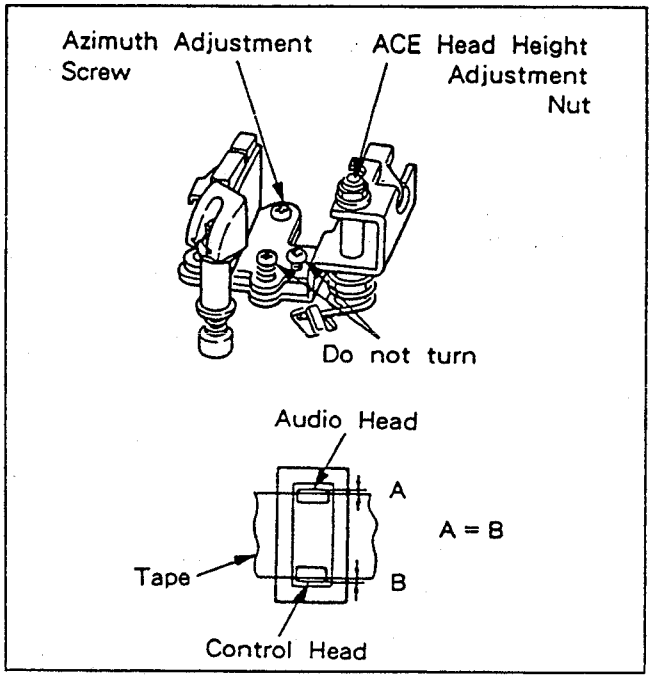


Fig. 6-4-3. (3) Pre-set for Compl Head Bracket

6-4-3. Guide Roller Adjustment (See Fig. 6-4-4.)

1) Play back the alignment tape (MH-2), press the tracking control key and adjust the envelope waveform to the maximum level.
2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient.
   In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

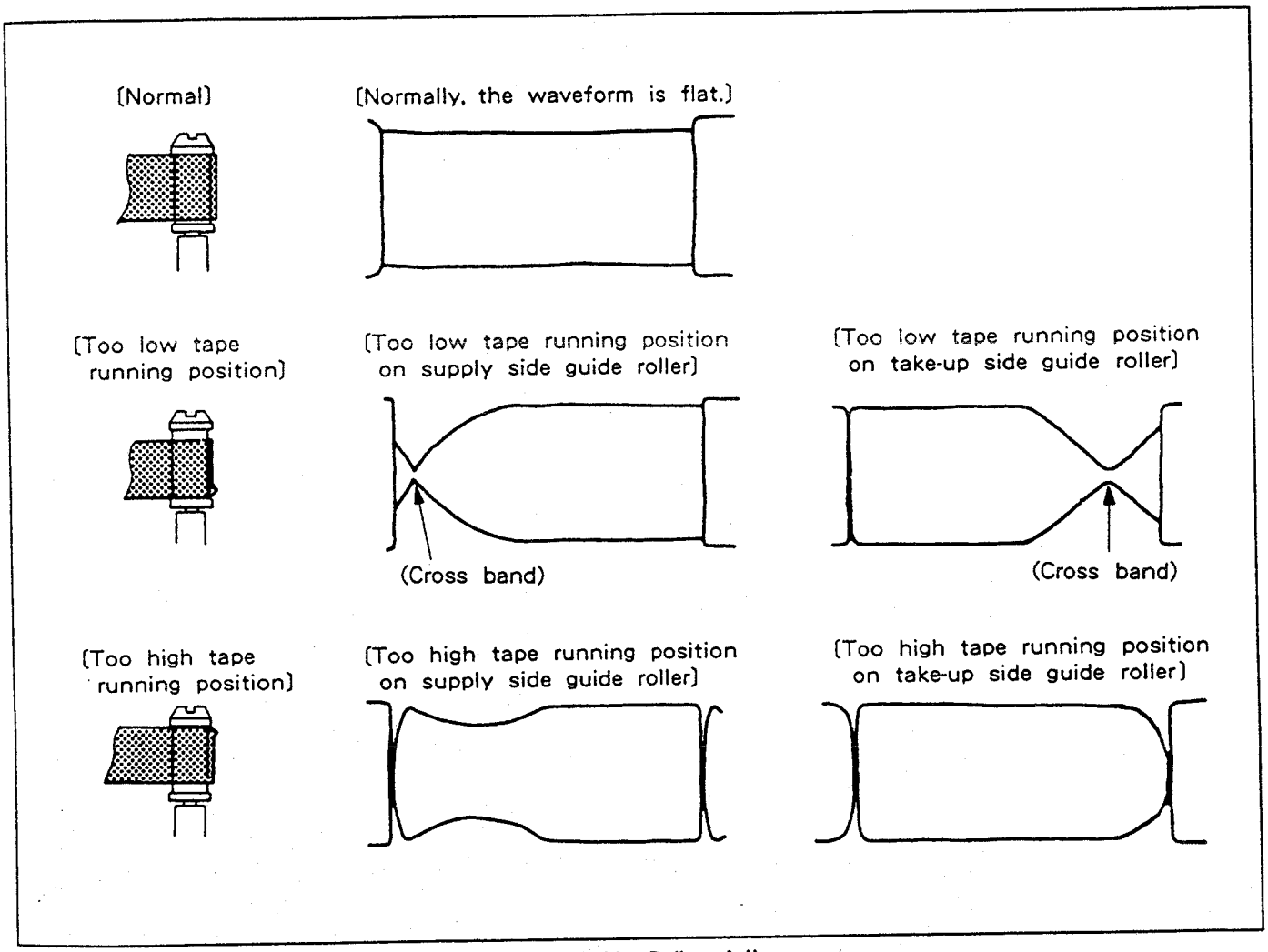

[Normal]
[Normally, the waveform is flat.]
[Too low tape running position]
[Too low tape running position on supply side guide roller]
(Cross band)
[Too low tape running position on take-up side guide roller]
(Cross band)
[Too high tape running position]
[Too high tape running position on supply side guide roller]
[Too high tape running position on take-up side guide roller]

Fig. 6-4-4. Guide Roller Adjustment

6-4-4. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment (See Fig. 6-4-5.)

1) Load the alignment tape (HiFi 400Hz) and set the PLAY mode.
2) Monitor the audio output waveform with the oscilloscope.
3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
6) Confirm that the audio output waveform amplitude does not fluctuate.

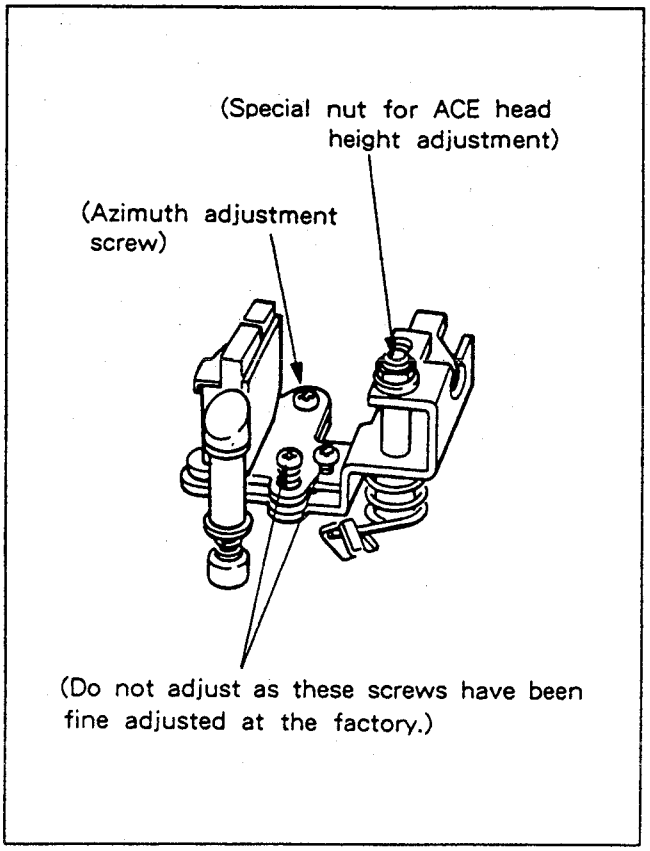

(Special nut for ACE head height adjustment)
(Azimuth adjustment screw)
(Do not adjust as these screws have been fine adjusted at the factory.)

Fig. 6-4-5. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 6-4-6.)

1)Load the alignment tape (HiFi 400Hz) and set the PLAY mode.

2)Set tracking to the center position with the tracking control key (See Note below).

3)Rotate the stopper bracket fixing screw 180° counterclockwise.

4)Monitor the video head output envelope waveform with the oscilloscope.

5)Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the up (▲) and down (▼) tracking control keys.

6)Tighten the fixing screw.

7)(Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0052) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback HiFi 400Hz and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.

8)Perform servo circuit PB PHASE (Switching position) adjustment.

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (▲, ▼) and observe the front panel clock display. It will read "T − : −" at the tracking center, "T − :, T − − :" when keeping the down (▼) key pressed, and "T : −, T : − −" when keeping the up (▲) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

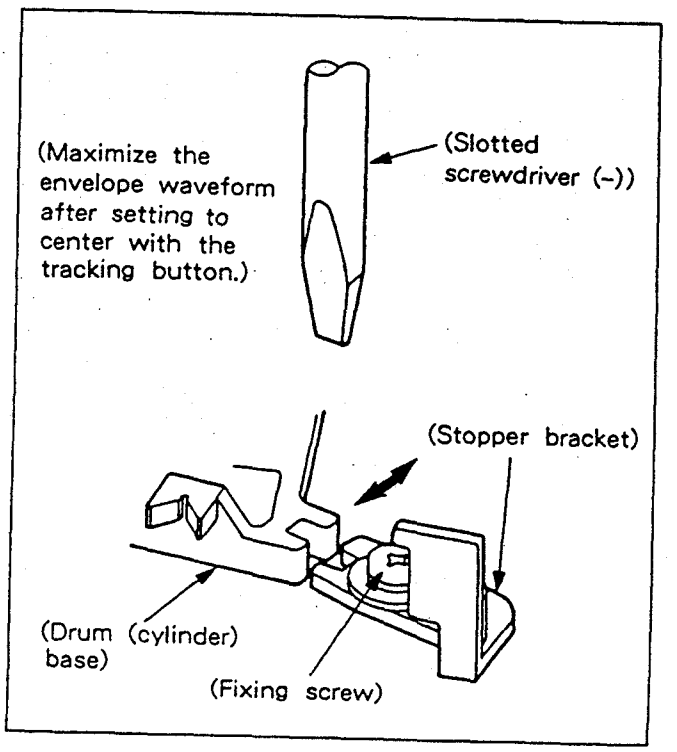

(Maximize the envelope waveform after setting to center with the tracking button.)
(Slotted screwdriver (−))
(Stopper bracket)
(Drum (cylinder) base)
(Fixing screw)

Fig. 6-4-6.

6-4-5. Checking after Adjustment

Tape running may show a slight change depending upon the type of the cassette tape (thick or thin tape), the start, middle, or end of cassette tape winding, etc. After performing the tape path adjustment with use of an alignment tape, be sure to check the following points. Incidentally, the alignment tape to be used should be E-180 or E-240 cassette should be a good one without any damage to it.

(1) Try to play back the alignment tape (MH-2) and confirm that the envelope waveform rise immediately and that there is no fluctuation in the envelope waveform and the audio output waveform.

(2) Load a cassette tape E-180 and start recording operation in the standard mode. 1 kHz should be fed to the audio input terminal when recording. After recording, the following points should be checked.

1. When the recorded portion is played back, the envelope waveform rise immediately, and no fluctuation in the envelope waveform is observed. Also, no speed drop occurs during the first half period or the last half period. Further, check to be sure that no fluctuation occurs in the audio waveform. Also confirm that neither the tape curling or derailing is caused on the upper or lower flange and the on the read side of the drum.
2. Confirm that no tape curling or derailing occurs in the upper or lower flange of each tape guide and the read side of the drum during each mode of operation, namely, FF, REW, F. SEARCH, and R. SEARCH.
3. Confirm that the envelope waveform rise immediately after changing the mode directly to the PLAY from each mode of FF, REW, F. SEARCH, R. SEARCH, or POWER OFF (INITIAL) and that no tape curling or derailing occurs in the upper or lower flange of the each tape guide and on the read side of the drum.

(3) Load a E-240 cassette tape and perform recording operation in the SP mode. 1 kHz should be fed to the audio input terminal when recording. Now, confirm that the envelope waveform rise immediately upon starting the playback of the recorded portion, and that neither fluctuation in the envelope waveform nor a speed drop occurs during the first half period or the last half period. Also confirm that no tape curling or derailing is caused in the upper or lower flange of each tape guide and on the drum lead surface.

(4) Perform recording for 60 seconds in the SP mode at the start of E-240 cassette winding. Play back the recorded portion and repeat the F.SEARCH ↔ R.SEARCH ten times, following which confirm that no damage is done to the tape edge.

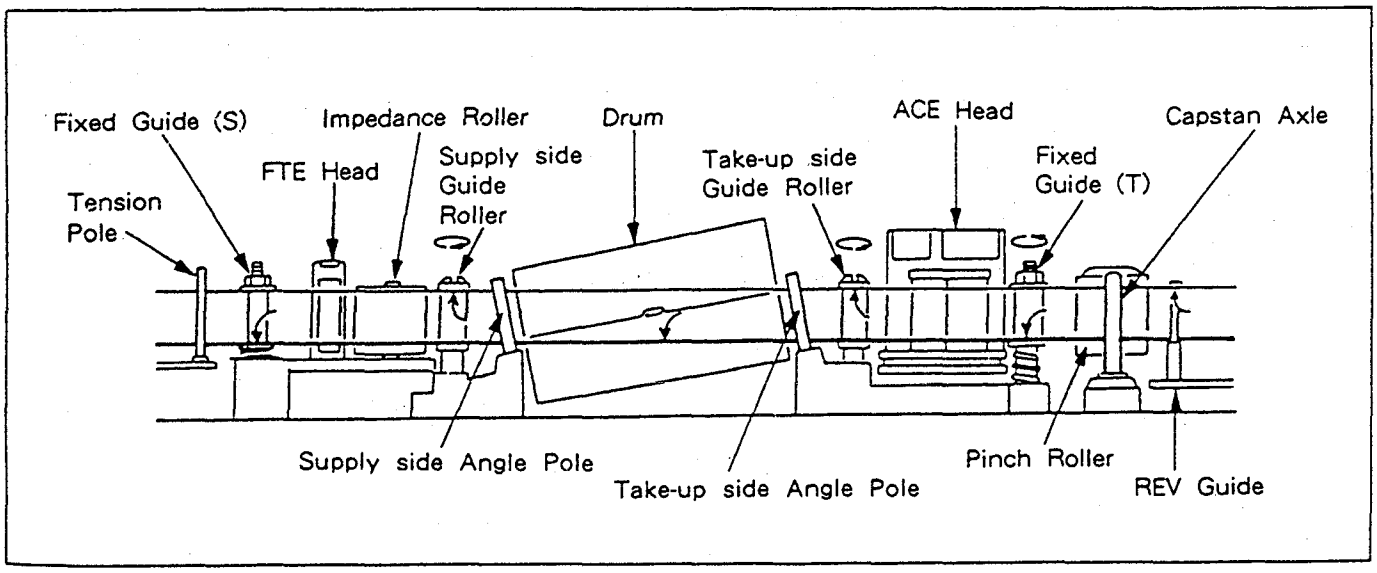
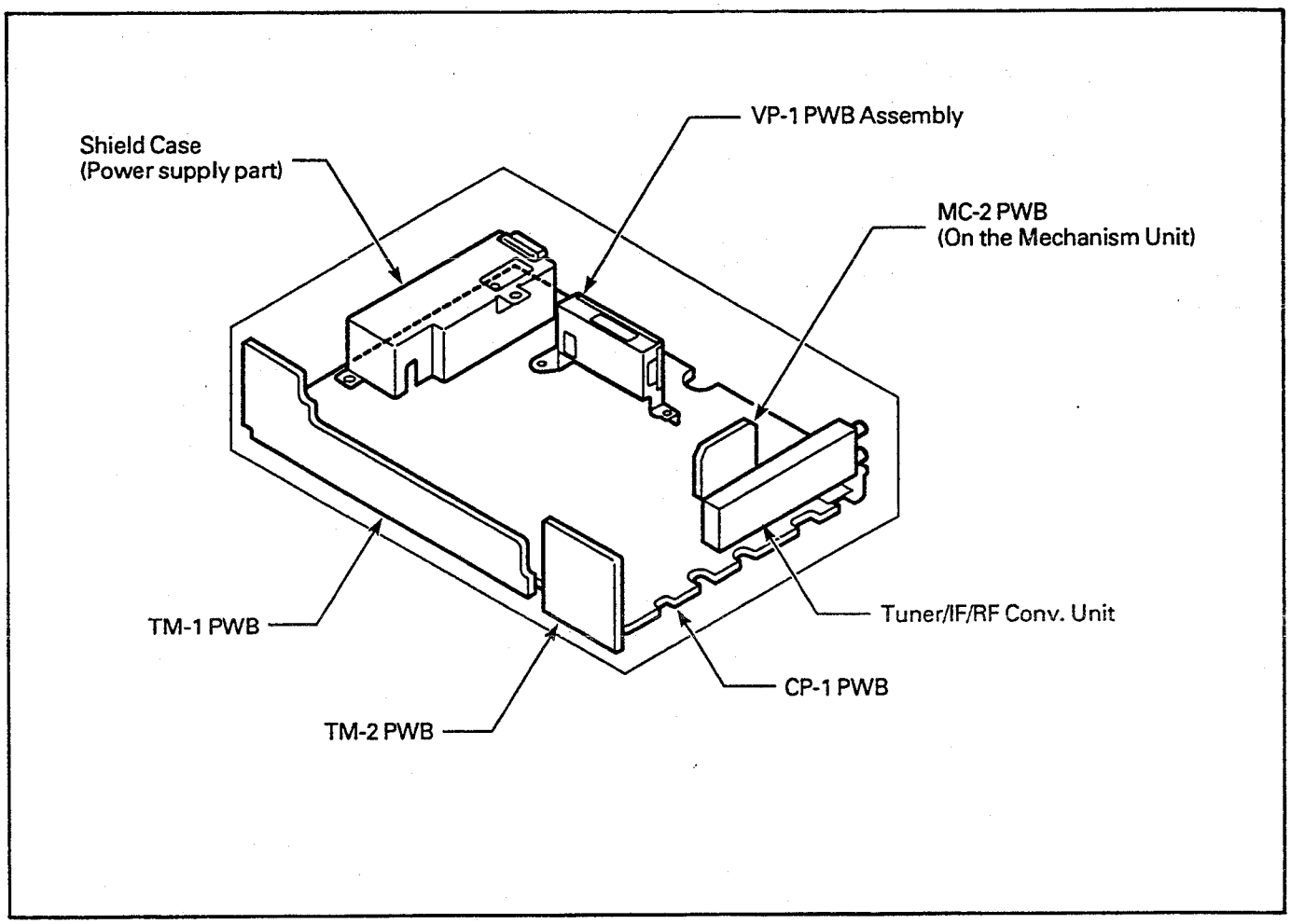

Fixed Guide (S)
Impedance Roller
Drum
ACE Head
Capstan Axle
FTE Head
Supply side Guide Roller
Take-up side Guide Roller
Fixed Guide (T)
Tension Pole
Supply side Angle Pole
Take-up side Angle Pole
Pinch Roller
REV Guide

Fig. 6-4-7.

SECTION 7
ELECTRICAL ADJUSTMENTS

CIRCUIT BOARDS LOCATION

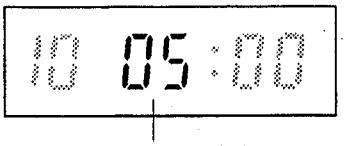


1. SELF-DIAGNOSIS DISPLAY

This unit displays the results of the self-diagnosis it carries out in two digits on the front panel indicator when problems occur. Although these digits will only roughly tell you what kind of problems have occurred, use them when servicing the unit.

1. Displaying the Self-Diagnosis Results

Press the STOP button for about 10 seconds continuously. Two digits (see below) showing the results of the self-diagnosis will be displayed for three seconds at the hours part of the timer. All other parts of the timer will go off. The time will automatically return after the three seconds.



Self-diagnosis digits

2. Self-Diagnosis Results

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
01	The cylinder motor does not rotate.	• The cylinder motor is faulty. • The control of the cylinder motor is faulty. • The tape winds around the cylinder.	Shifts to the STOP mode.
02	The take-up reel does not rotate.	• The take-up reel is caught. • The belt is faulty. • The take-up torque has decreased.	Shifts to the STOP mode.
03	The capstan motor does not rotate.	• The capstan motor is faulty. • The control of the capstan motor is faulty.	Shifts to the STOP mode.
04	The tape cannot be loaded with the cassette inserted. (But unloading can be performed.)	• Error in the operations of the tape loading mechanism. • Foreign particles in the tape loading mechanism. • The tape end sensor is faulty. • The reel brake of the tape cassette has not been released.	Unloads, shifts to the INITIAL mode, and the power goes off.
05	Tape loading and unloading cannot be performed with the cassette inserted.	• The tape guide is caught. • The loading motor is faulty. • The control of the loading motor is faulty.	The power is forcibly turned off with the mechanism at its current position.
06	Front unloading cannot be performed when ejecting the cassette. (Front loading can be performed.)	• The cassette holder mechanism is faulty. • The front door is caught.	Front loads and shifts to the STOP or INITIAL mode. When the power switch is turned on before eject operations: Shifts to the STOP mode. When the power switch is turned off before eject operations: Shifts to the INITIAL mode and the power goes off.
07	Front loading and front unloading cannot be performed when ejecting the cassette.	• The tape cassette is caught in the cassette holder mechanism. • The gears of the front loading drive mechanism have not engaged properly.	The power is forcibly turned off with the mechanism at its current position.
08	The mechanism becomes 1 (BRAKE) while moving from 2 (STOP, FF/REW), 3(STILL), 4 (PLAY), and to 5 (IDLER).	• The mechanism position switch contact is faulty.	The power is forcibly turned off with the mechanism at its current position.
09	The mechanism becomes 7 (INITIAL) while moving from 1 (BRAKE), 2 (STOP, FF/REW), 3(STILL), 4 (PLAY), and to 5 (IDLER).	• The mechanism position switch contact is faulty.	Carries out tape take-up operations, shifts to the INITIAL mode, and the power goes off.

Note: For details of mechanism operations corresponding to the mechanism positions of the self-diagnosis numbers 08 and 09 above, refer to the separate volume on the mechanism manual. These manual reference numbers are ahown in the cover.

2. ELECTRICAL ADJUSTMENT

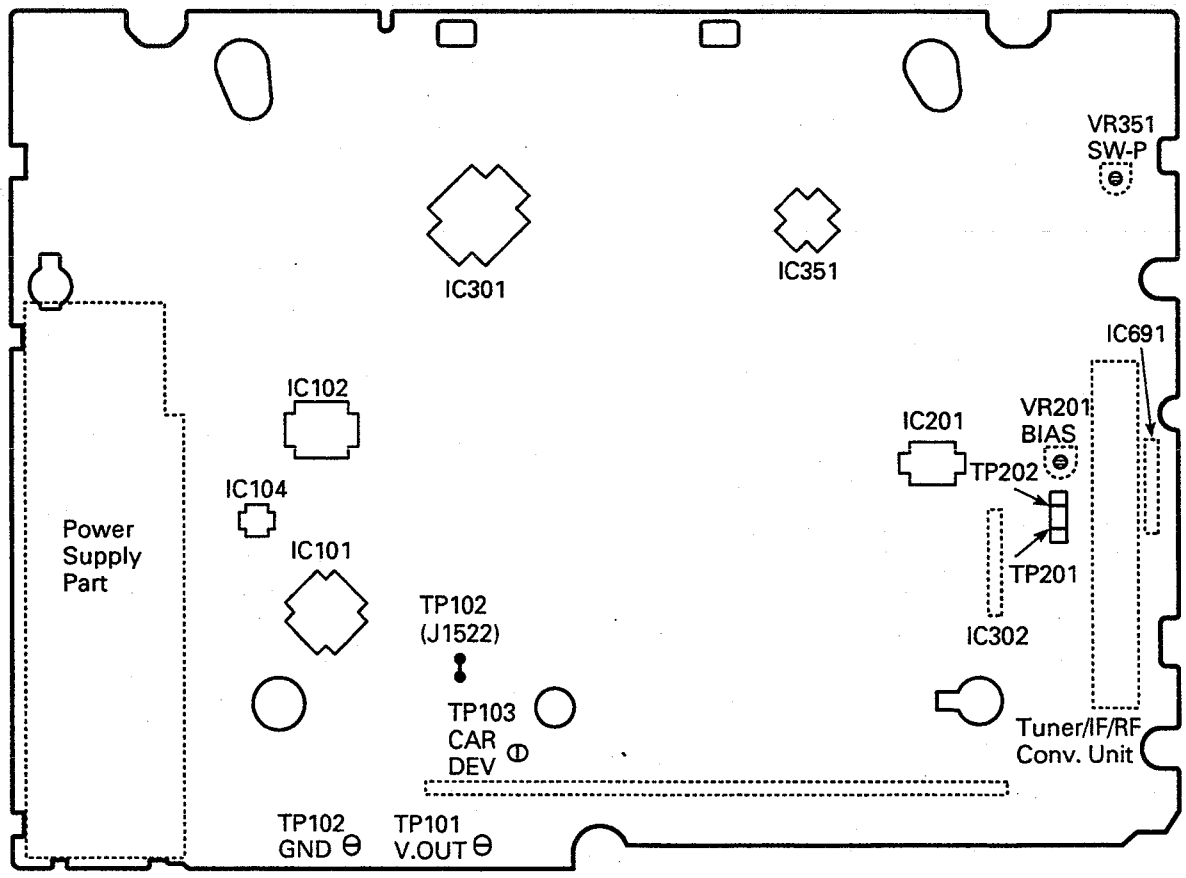
2-1. SERVO CIRCUIT ADJUSTMENT

- These adjustments should be carried out upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are carried out after these adjustments, follow the procedures again in Section 2-1-3. SWITCHING POSITION ADJ.
- When a cassette tape is loaded, auto-tracking will be set immediately after starting the first playback. As this will deviate the tracking center set, be sure to press the tracking buttons (▲) or (▼) once directly after starting playback to prevent auto-tracking from being set.

2-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

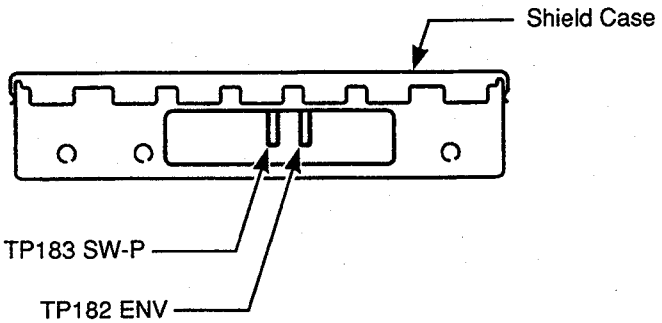
Oscilloscope	Vertical sensitivity: 5 mV/DIV, external trigger Band width: more than 10 MHz
Alignment Tape	MH-2 (H-7099-052-H) : SP mode, monoscope, 6 KHz
Blank Tape	VHS-type cassette tape
Monitor TV	

2-1-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (FOIL SIDE)

Fig. 2.1.1



VP-1 PWB Assembly

Fig. 2.1.2

Note:

- Self-recording means "Record any broadcasting or video signal and play back the just-recorded portion".

2-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
TP101 (VIDEO OUT) TP183 (SW-P)	Oscilloscope	PLAY mode Aignment tape MH-2 (H-7099-052-H)

ADJ. Location	ADJ. Value
VR351 (SW-P)	6.5 H ± 0.5 H

1. Set the tracking control position to the center by pressing TRACKING buttons (▲) and (▼) simultaneously. (Tracking center position display in the indicator panel "T –:– ")
2. Adjust VR351 (SW-P) so that the width "T" becomes **6.5 H ± 0.5 H** as shown in Fig. 2.1.3.

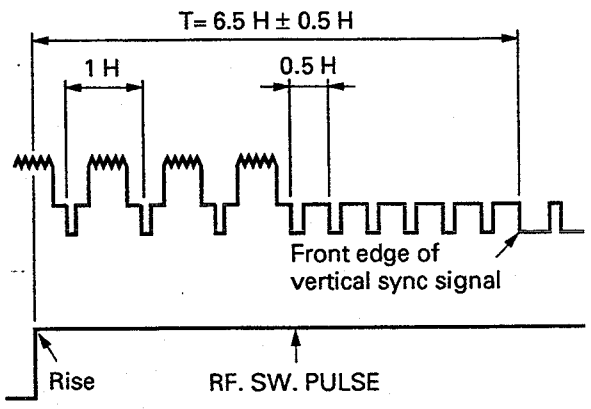


Fig. 2.1.3

2-1-4. STILL V-LOCK ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
Picture of monitor TV	Color bar generator or Broadcasting Monitor	Self-recording STILL mode Blank tape

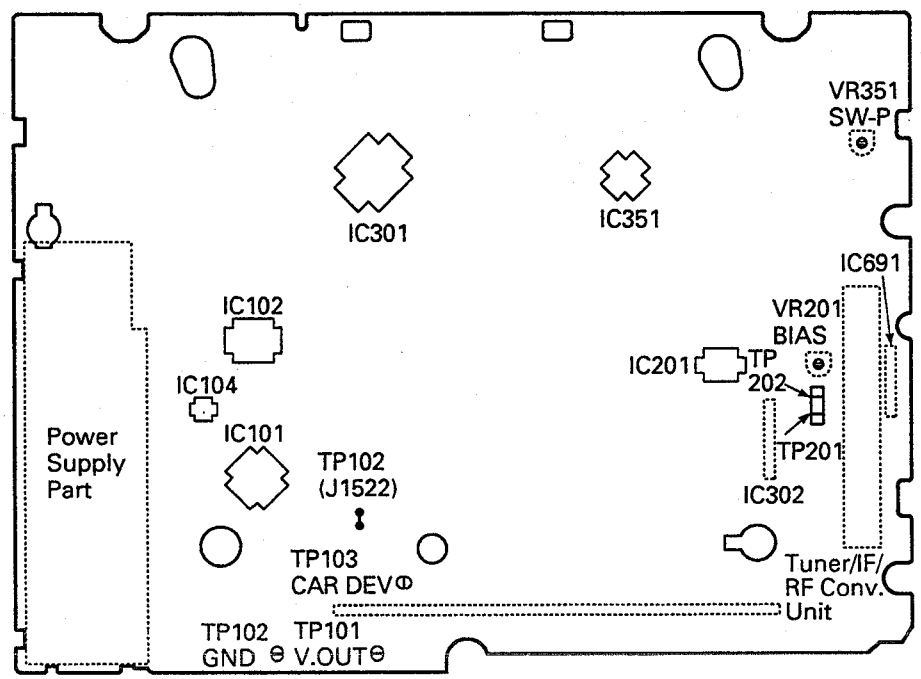
ADJ. Location	ADJ. Value
TRACKING (▲) button TRACKING (▼) button	The minimum vertical shake

1. Play back the just-recorded portion and then set the VCR in the STILL mode.
2. Press the TRACKING (▲) button or the TRACKING (▼) button so that any vertical shake of the picture is brought to its minimum.

2-2. VIDEO CIRCUIT CONFIRMATION

- This VCR does not need any video circuit adjustments. However , AGC and PB-Y levels are checkable.
- Test point TP102 for AGC level and TP101 for PB-Y level are shown as belows.

2-2-1. LOCATION OF TEST POINTS



CP-1 PWB (FOIL SIDE)

Fig. 2.2.1

2-2-2. AGC LEVEL CHECK.

Measuring Point	Measuring Equipment	Condition
TP102(J1522)	Color bar generator Oscilloscope (10:1 probe)	E-E mode

ADJ. Location	Specified Value
—	0.5 Vp-p ± 0.025 Vp-p

1. Connect the color bar generator to the VIDEO INPUT terminal.
2. Confirm that the AGC level is **0.5 Vp-p ± 0.025 Vp-p** as shown in Fig. 2.2.2.

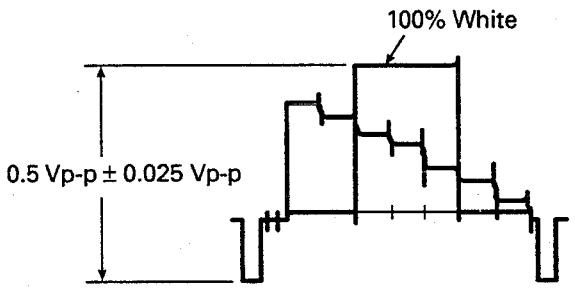


Fig. 2.2.2

2-2-3. PB-Y LEVEL CHECK.

Measuring Point	Measuring Equipment	Condition
TP101	Oscilloscope	PLAY mode Aignment tape MH-2 (H-7099-052-H)

ADJ. Location	Specified Value
VR101 (PB-Y)	1 Vp-p ± 0.05 Vp-p

1. Terminate the VIDEO OUTPUT terminal with a 75Ω resister.
2. Confirm that the video luminance signal level is **1 Vp-p ± 0.05 Vp-p.** (Refer to Fig. 2.2.3)

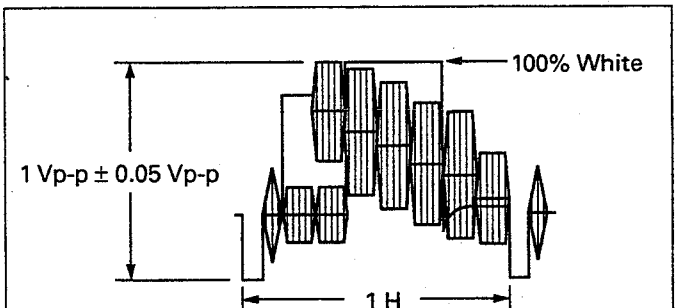


Fig. 2.2.3

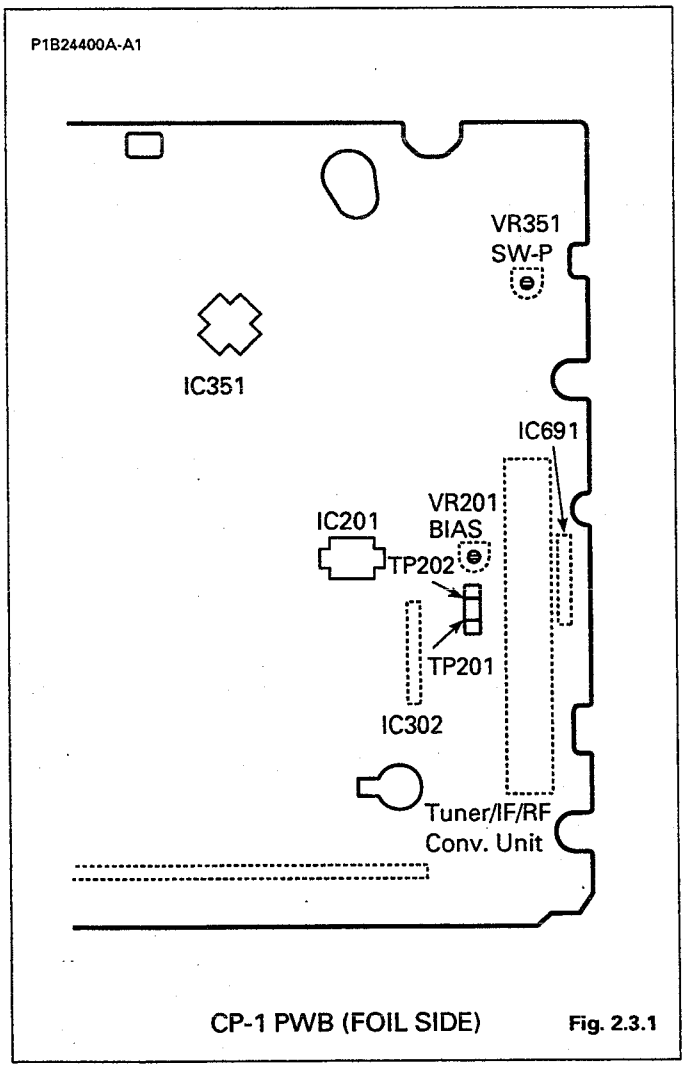
2-3. AUDIO CIRCUIT ADJUSTMENT

- Before making these adjustments, (especially, the tape guide height and audio control erase head height adjustments) should be carried out, so that the tape traveling between the loading guide pole and the audio control erase head runs without fluttering, twisting, curling.
- Before making this adjustment, Section 2-1. SERVO circuit adjustment should be carried out.

2-3-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Oscilloscope	Vertical sensitivity : 10 mV/DIV Band width : more than 30 MHz
AC Voltmeter	Effective value indication Input frequency : 10 Hz ~ 20 kHz Input Impedance : more than 1 MΩ Measurement level : 1mV (full scale)
Blank Tape	VHS-type cassette tape

2-3-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (FOIL SIDE) Fig. 2.3.1

2-3-3. BIAS LEVEL ADJ.

Measuring Point	Measuring Equipment	ADJ. Condition
TP201 (HOT) TP202 (GND)	Oscilloscope AC voltmeter	REC mode Blank tape

ADJ. Location	ADJ. Value
VR201 (BIAS)	26 mVrms

1. Load the VCR with a blank tape and select the record mode without all incoming signal.
2. After confirming on the oscilloscope that a 70 kHz ± 5 kHz sine wave is being output, adjust VR201 (BIAS) so that the AC voltmeter's reading is **26 mVrms**.

2-4. TUNER AND IF CIRCUITS ADJUSTMENT

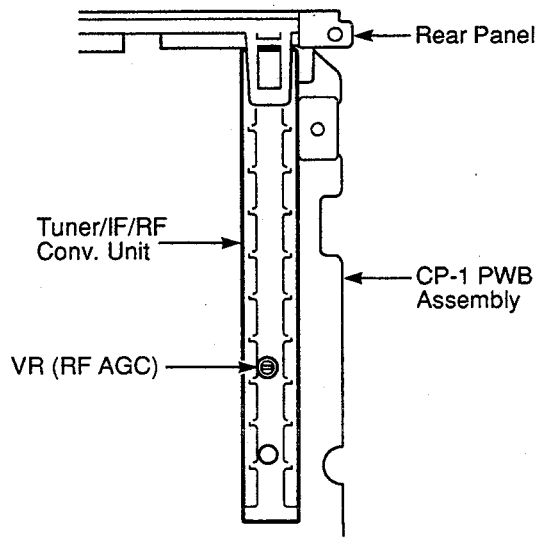
- When any malfunction occurs in the TUNER circuit the whole unit must be replaced.
- An adjustment of the IF circuit is shown as follows.

Note: The TUNER unit does not need any adjustments, because precise adjustments have been performed before shipment.

2-4-1. TEST EQUIPMENT AND STANDARD REQUIRED

Monitor TV	

2-4-2. LOCATION OF ADJUSTMENT POINT



IF UNIT (PARTS SIDE) **Fig. 2.4.1**

2-4-3. RF AGC ADJ.

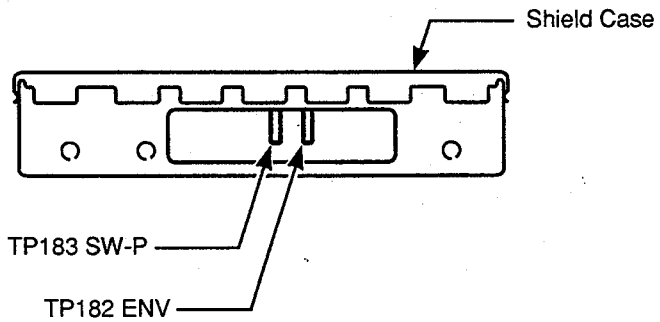
Measuring Point	Measuring Equipment	ADJ. Condition
Picture of monitor TV	Monitor TV	E-E mode

ADJ. Location	ADJ. Value
VR (RF AGC) (on the IF circuit)	S/N is best point

1. Connect the monitor TV to VHF/UHF ANTENNA OUTPUT terminal.
2. Connect the VHF antenna to VHF/UHF ANTENNA INPUT terminal.
3. Receive the middle electrical field (70 dBμ ~ 90 dBμ) of the VHF high channel, and slowly turn VR (RF AGC) from the point where snow-noise is present to the point where it just disappears from the monitor TV.
4. Confirm by monitor TV that there is no beat and saturation (S/N is best point) when receiving any TV channel.

3. TEST POINT FOR TAPE PATH ADJUSTMENT

Test point TP182 (ENV) and TP183 (SW-P) for tape path adjustment is shown in Fig. 3.1.

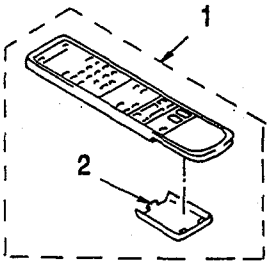


VP-1 PWB Assembly **Fig. 3.1**

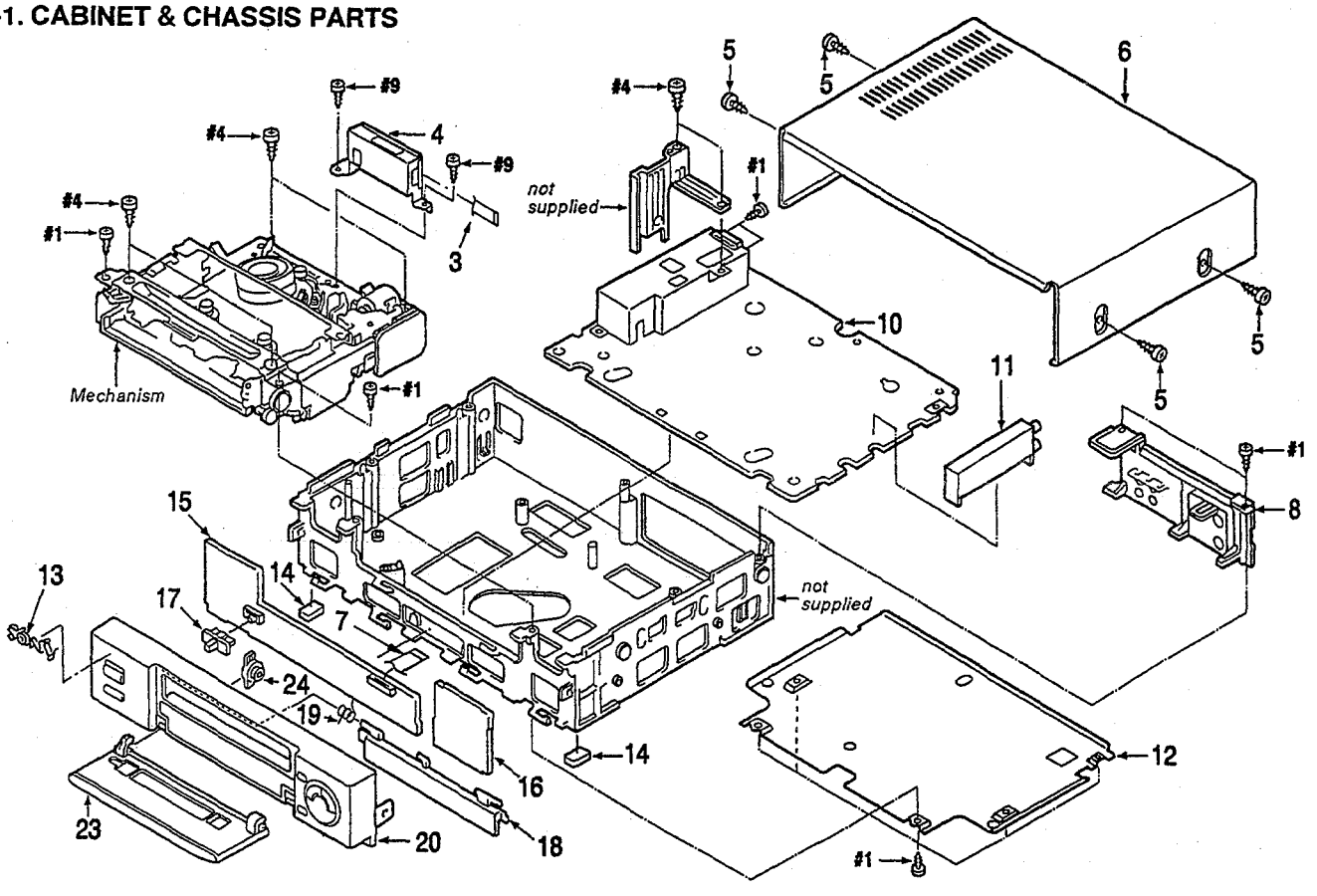
SECTION 8
EXPLODED VIEWS

NOTE :

- -XX, -X mean standardized parts, so they may have some difference from the original one.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list and accessories and packing materials are given in the last of this parts list.
- **Information for SLV-X211ME also includes information for SLV-X211MEJ/SG.**



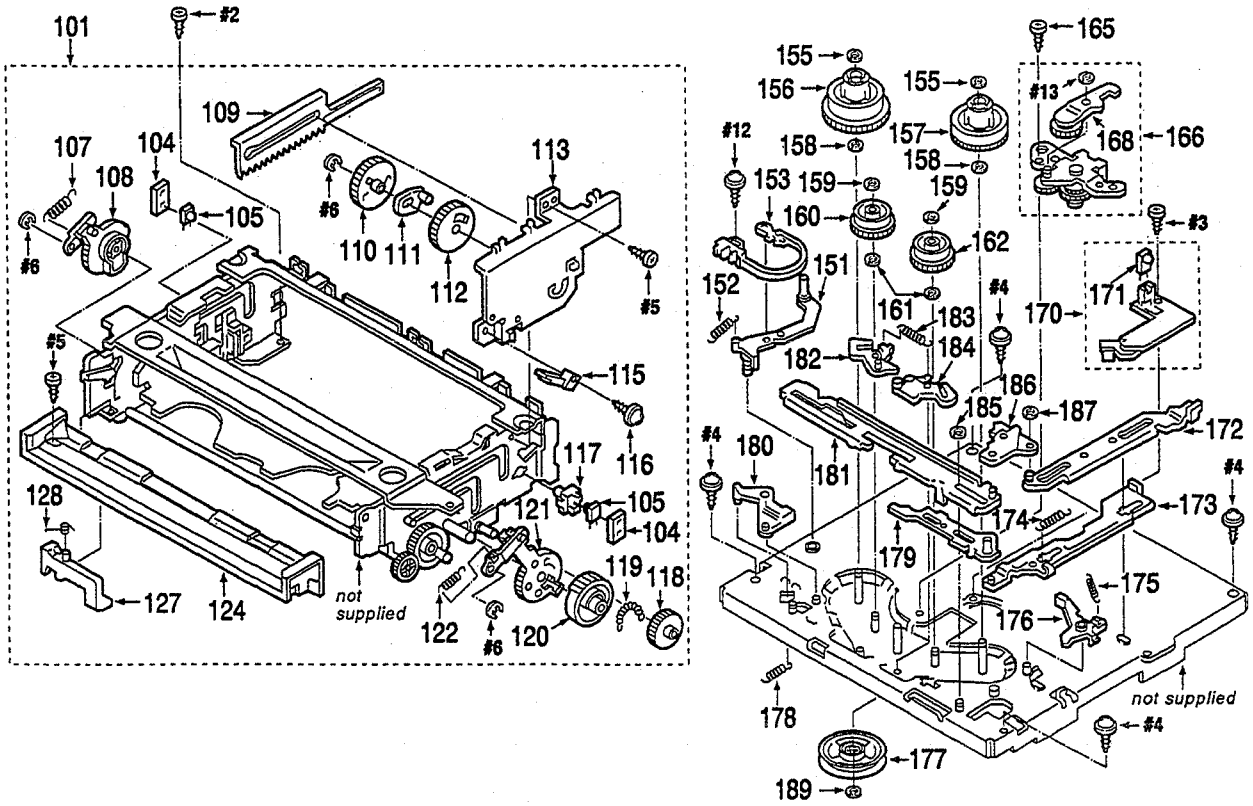
8-1. CABINET & CHASSIS PARTS



Ref. No.	Part No.	Description	Remark
1	1-467-749-11	REMOTE COMMANDER (RMT-V155E)(236EE)	
1	1-467-749-21	REMOTE COMMANDER (RMT-V155H) (X211ME/PS/SA)	
2	3-708-885-01	COVER, BATTERY	
3	1-765-272-11	CABLE, FLEXIBLE FLAT 11P	
* 4	A-6754-716-A	VP-1 BOARD, COMPLETE(236EE/X211ME)	
* 4	A-6754-838-A	VP-1 BOARD, COMPLETE(X211PS/SA)	
5	3-740-382-01	+BTS-B S 4X12	
* 6	3-958-580-01	COVER, TOP(X211ME/PS/SA)	
* 6	3-958-800-01	COVER, TOP(236EE)	
7	1-765-583-11	CABLE, FLEXIBLE FLAT 34P	
* 8	3-958-683-01	TERMINAL BOARD(236EE/X211ME/PS)	
8	3-959-917-01	PLAT, TERMINAL(X211SA)	
* 10	A-6754-702-A	CP-A BOARD, COMPLETE(X211ME)	
* 10	A-6754-709-A	CP-A BOARD, COMPLETE(236EE)	
* 10	A-6754-831-A	CP-A BOARD, COMPLETE(X211PS)	
* 10	A-6754-840-A	CP-A BOARD, COMPLETE(X211SA)	
11	1-693-248-11	TUNER (RF/TU/IF)(236EE/X211ME/PS)	
11	1-693-261-11	TUNER (RF/TU/IF)(X211SA)	

Ref. No.	Part No.	Description	Remark
* 12	3-958-695-01	COVER, BOTTOM	
13	3-942-768-02	EMBLEM (NO. 5), SONY(236EE/X211PS)	
* 14	3-942-661-01	STAND, FELT	
* 15	A-6754-714-A	TM-1 BOARD, COMPLETE(236EE)	
* 15	A-6754-717-A	TM-1 BOARD, COMPLETE(X211ME/PS/SA)	
* 16	A-6754-718-A	TM-2 BOARD, COMPLETE	
17	3-948-749-01	KNOB, SLIDE(X211ME/PS/SA)	
18	3-958-579-01	DOOR, CASSETTE(236EE)	
18	3-958-581-01	DOOR, CASSETTE(X211ME/PS/SA)	
19	3-958-697-01	SPRING (CASSETTE DOOR)	
20	A-6704-906-A	CABINET ASSY, FRONT(X211ME/SA)	
20	A-6704-909-A	CABINET ASSY, FRONT(236EE)	
20	A-6704-986-A	CABINET ASSY, FRONT(X211PS)	
23	A-6704-907-A	DOOR ASSY(X211ME)	
23	A-6704-910-A	DOOR ASSY(236EE)	
23	A-6704-987-A	DOOR ASSY(X211PS)	
23	A-6704-989-A	DOOR ASSY(X211SA)	
24	3-955-083-01	DAMPER	

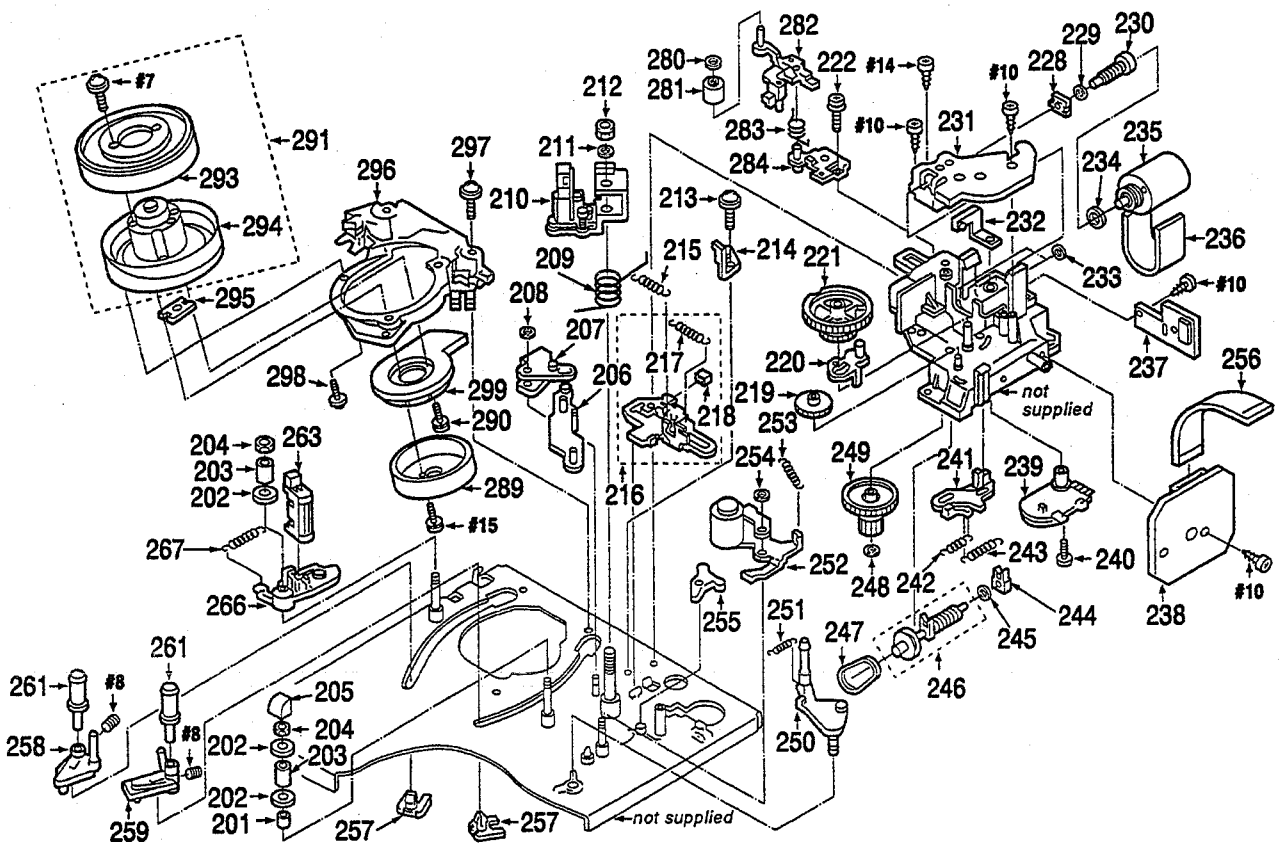
8-2. MECHANISM PARTS 1



Ref. No.	Part No.	Description	Remark
101	A-6779-199-A	MECHANICAL ASSY, CASSETTE	
104	3-735-734-01	LID	
105	1-808-710-11	PHOTO TRANSISTOR	
107	3-735-720-01	SPRING	
108	3-735-719-01	LEVER (L) ASSY, GEAR	
109	3-740-344-01	LOCK	
110	3-957-608-01	GEAR, LOCK	
111	3-957-609-01	LEVER (ASSY), PINION	
112	3-735-730-01	GEAR, PINION	
113	3-740-342-01	BRACKET, GEAR	
115	3-740-345-01	BUTTON, SPECIAL SW	
116	3-735-775-01	SCREW (2X9), +PSW	
* 117	3-940-408-01	HOLDER, TRANSISTOR	
118	3-735-728-01	GEAR, IDLER	
119	3-735-725-01	SPRING	
120	3-735-724-01	GEAR, MAIN	
121	3-735-723-01	GEAR ASSY, LEVER	
122	3-735-726-01	SPRING	
124	3-735-716-01	FRAME, LOWER	
127	3-942-686-01	LEVER, SAFETY SWITCH	
128	3-942-688-01	SPRING, SAFETY SWITCH	
151	3-740-352-01	LEVER, TENSION	
152	3-735-654-01	SPRING	
153	3-735-690-01	HOLDER ASSY, BAND	
155	3-735-755-01	WASHER (DIA. 2.6)	
156	3-948-608-01	REEL (ASSY), SUPPLY	
157	3-958-688-01	REEL (ASSY), TAKE-UP	

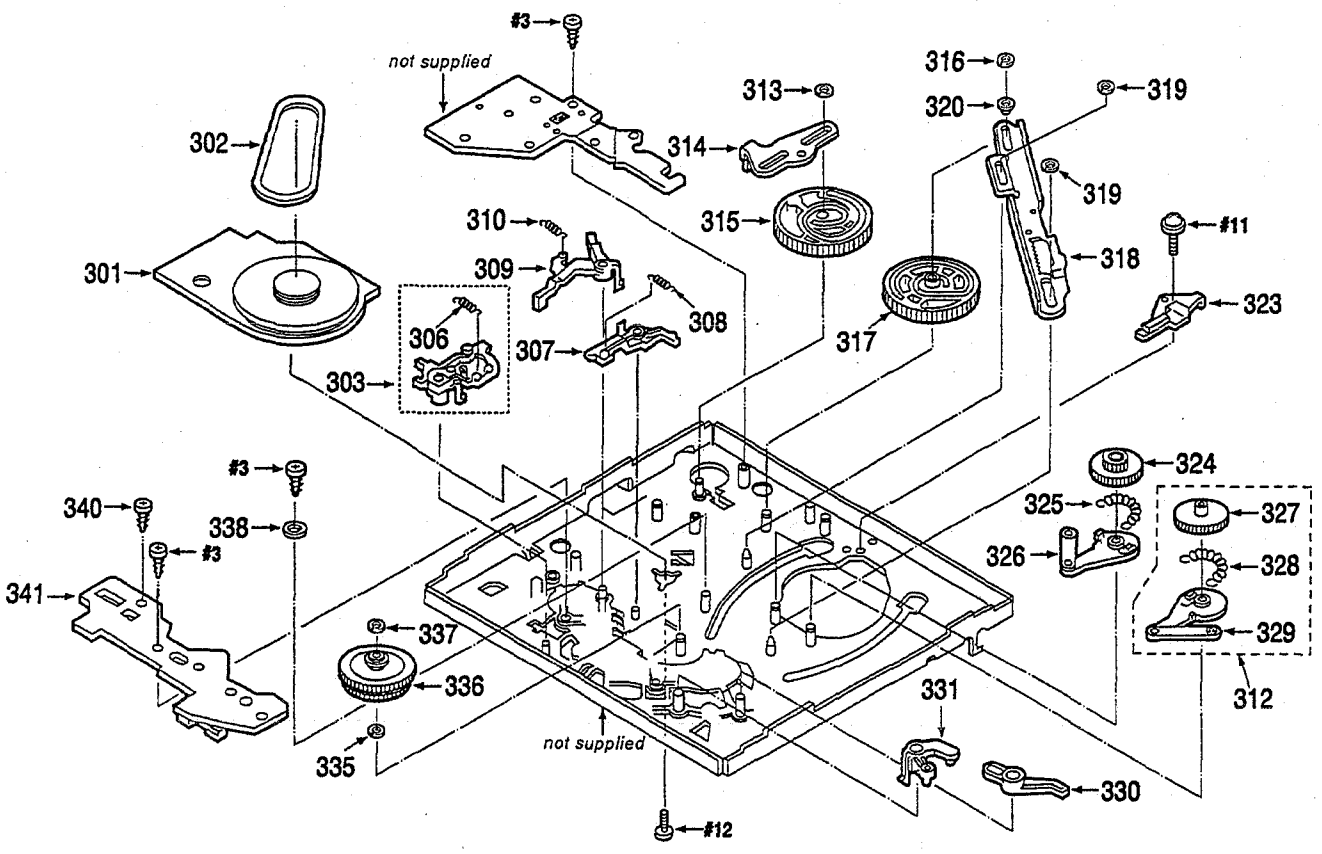
Ref. No.	Part No.	Description	Remark
158	3-735-754-01	WASHER (DIA. 3), ADJUSTMENT	
159	3-741-401-01	WASHER Y 2.1X6X0.25	
160	3-958-708-01	GEAR, SUPPLY REEL	
161	3-735-750-01	WASHER (DIA. 2.6), SPECIAL	
162	3-958-709-01	GEAR, TAKE-UP REEL	
165	3-942-657-01	SCREW (2.6X4), SPECIAL	
166	A-6773-689-A	IDLER CLUTCH BOARD, COMPLETE	
168	3-947-394-01	IDLER (ASSY)	
* 170	A-6756-374-A	MC-4 BOARD, COMPLETE	
171	1-808-722-11	DIODE LN59	
* 172	3-735-662-01	PLATE ASSY, SLIDE	
173	3-955-019-01	SLIDE, C BRAKE	
174	3-735-627-01	SPRING	
175	3-735-665-01	SPRING	
176	3-740-349-01	BRAK SUB, T	
177	3-735-652-01	PULLEY	
178	3-740-348-01	SPRING	
* 179	3-735-628-01	BRAKE, SLIDE ACT	
180	3-735-655-01	BRAKE SUB, S	
* 181	3-735-661-01	PLATE ASSY, SLIDE	
182	3-735-656-01	BRAKE ASSY, S	
183	3-735-658-01	SPRING	
184	3-735-657-01	BRAKE ASSY, T	
185	3-735-761-01	WASHER (DIA. 2.6)	
186	3-735-663-01	LEVER, CONTROL	
187	3-746-725-01	WASHER, SPECIAL	
189	3-948-603-01	WASHER, SPECIAL	

8-3. MECHANISM PARTS 2



Ref. No.	Part No.	Description	Remark
201	3-942-673-01	SLEEVE	
202	3-741-408-01	WASHER, SPECIAL	
203	3-942-674-01	GUIDE, TAPE	
204	3-948-510-01	NUT (HEX 3)	
205	3-943-187-01	CAP	
* 206	3-735-672-01	SLIDE ASSY, PINCH	
* 207	3-735-673-01	PINCH LEVER ASSY	
208	3-735-759-01	WASHER (DIA. 3)	
209	3-735-680-01	SPRING	
210	3-957-444-01	BRACKET (COMPLETE PCB), HEAD	
211	3-749-106-01	SLEEVE, ACE HEAD	
212	3-735-682-01	NUT (M5), SPECIAL	
213	3-741-410-01	SCR PAN+SE+W 2.6X5	
214	3-942-071-01	STOPPER, BRACKET	
215	3-735-670-01	SPRING	
216	A-6773-727-A	SLIDE CAM, COMPLETE ASSY	
217	3-735-669-01	SPRING	
218	3-735-668-01	DAMPER	
219	3-735-704-01	GEAR	
220	3-740-366-01	LEVER, FRONT	
221	3-735-703-01	GEAR (F), HELICAL	
222	3-741-414-01	SCR PAN+SW+W 2.6X6	
228	3-735-696-01	HOLDER, WORM	
229	3-740-357-01	WASHER	
230	3-735-706-01	WORM ASSY, F	
231	3-942-065-01	BRACKET, HOLDER	
232	3-740-354-01	PLATE, NUT	
233	3-740-365-01	DAMPER, MOTOR	
234	3-735-708-01	DAMPER, WORM	
235	3-942-091-01	MOTOR ASSY, THREADING	
236	3-740-358-01	DAMPER, MOTOR	
* 237	1-589-398-11	MC-3 BOARD	
* 238	1-589-612-11	MC-2 BOARD	
239	1-572-383-11	SWITCH, ROTARY	
240	3-741-411-01	SCR PAN 2.6X13	
241	3-740-362-01	SLIDE, FRONT	
242	3-740-363-01	SPRING	
243	3-740-364-01	SPRING	
244	3-741-413-01	HOLDER WORM	
245	3-735-774-01	WASHER (DIA. 2)	
246	3-740-359-01	LOAD WORM	
247	3-735-709-01	BELT (LOADING)	
248	3-740-367-01	WASHER, SLIT	
249	3-740-361-01	GEAR, HELICAL	
250	3-749-023-01	GUIDE (REV), LEVER ASSY	
251	3-735-660-01	SPRING	
252	3-735-674-01	PINCH ROLLER, COMPL	
253	3-954-779-01	SPRING (PINCH ROLLER)	
254	3-735-757-01	WASHER (DIA. 3.6)	
255	3-735-671-01	LEVER, ACT BRAKE	
256	1-765-273-11	CABLE, FLEXIBLE FLAT 22P	
257	3-954-780-01	PLATE, BGR	
258	3-955-988-01	MOUNT (ASSY), ROLLER S	
259	3-955-989-01	MOUNTING (ASSY), ROLLER T	
261	3-735-630-01	ROLLER ASSY, GUIDE	
263	3-958-712-01	HEAD, FULL ERASE	
266	3-958-711-01	LEVER, FE HEAD	
267	3-735-686-01	SPRING	
280	3-735-758-01	WASHER (DIA. 2.6)	
281	3-944-844-01	CLEANER ASSY, ROLLER	
282	3-954-694-01	CLEANER (ASSY), LEVER	
283	3-942-069-01	SPRING	
284	3-954-693-01	BRACKET, CLEANER	
* 289	1-461-017-11	ROTOR	
290	3-741-416-01	SCR PAN+SW+W 2.3X10	
291	A-6050-895-A	CYLINDER BOARD, COMPLETE	
293	3-954-721-01	CYLINDER (UPR)(2N2P-UK)	
294	3-940-516-01	CYLINDER ASSY (LOWER 2)	
295	3-735-738-01	SPACER, MOTOR	
* 296	3-735-737-01	CYLINDER BASE	
297	3-740-398-01	SCR PAN+FLG 3X6	
298	3-740-370-01	SCREW (2.6X8), SPECIAL	
299	1-462-284-11	STATOR	

8-4. MECHANISM PARTS 3



Ref. No.	Part No.	Description	Remark
301	1-698-156-11	MOTOR, CAPSTAN (DC 3W)	
302	3-735-691-01	BELT (REEL DRIVE)	
303	3-947-435-01	CLUTCH (ASSY), LEVER	
306	3-735-646-01	SPRING	
307	3-735-647-01	LEVER, CONVERSION CLUTCH	
308	3-735-648-01	SPRING	
309	3-735-649-01	BRAKE ASSY, CAP	
310	3-741-405-01	CAPSTAN, SPRING	
312	A-6773-545-A	RING LOAD (S) BOARD, COMPLETE	
313	3-735-759-01	WASHER (DIA. 3)	
314	3-955-018-01	SLIDE, CAM PLATE	
315	3-735-639-01	CAM, MODE	
316	3-735-756-01	WASHER (DIA. 3)	
317	3-947-406-01	CAM, MAIN	
318	3-948-513-01	ROAD (ASSY), RACK	
319	3-735-758-01	WASHER (DIA. 2.6)	

Ref. No.	Part No.	Description	Remark
320	3-948-514-01	SPACER, RACK ROAD	
323	3-735-693-01	PLATE ASSY, GROUND	
324	3-948-511-01	GEAR, ROAD TAKE-UP	
325	3-735-637-01	SPRING (T)	
326	3-735-636-01	LOAD (T) ASSY, LEVER	
327	3-746-724-01	ROAD (S), GEAR	
328	3-735-634-01	SPRING	
329	3-735-633-01	LOAD (S) ASSY, LEVER	
330	3-735-766-01	LEVER, RETURN TENSION	
331	3-740-368-01	CONTROL ASSY, LEVER	
335	3-735-760-01	WASHER (DIA. 3), SPECIAL	
336	3-958-710-01	GEAR (ASSY), FRICTION	
337	3-948-603-01	WASHER, SPECIAL	
338	3-749-608-01	WASHER (Z)	
340	3-740-396-01	SCR STPG BIN 2.6X5	
341	A-6756-237-A	MC-1 BOARD, COMPLETE	

SECTION 9
ELECTRICAL PARTS LIST

CP-A

NOTE :
- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS
  All resistors are in ohms
  METAL : Metal-film resistor
  METAL OXIDE : Metal oxide-film resistor
  F : nonflammable
- Items marked " * "are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- SEMICONDUCTORS
  In each case, u : μ , for example :
  uA.... : μ A.... , uPA.... : μ PA....
  uPB.... : μ PB.... , uPC.... : μ PC....
  uPD.... : μ PD....
- CAPACITORS
  uF : μ F
- COILS
  uH : μ H

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

When indicating parts by reference number, please include the board.

- **Information for SLV-X211ME also includes information for SLV-X211MEJ/SG.**

Ref.No.	Part No.	Description			Remark
*	A-6754-702-A	CP-A BOARD, COMPLETE(X211ME)			
*	A-6754-709-A	CP-A BOARD, COMPLETE(236EE)			
*	A-6754-831-A	CP-A BOARD, COMPLETE(X211PS)			
*	A-6754-840-A	CP-A BOARD, COMPLETE(X211SA)			
		**********			
	1-533-259-11	HOLDER, FUSE			
		< CAPACITOR >			
C1001	1-126-154-11	ELECT	47uF	20%	6.3V
C1005	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1008	1-126-301-11	ELECT	1uF	20%	50V
C1009	1-126-154-11	ELECT	47uF	20%	6.3V
C1010	1-126-301-11	ELECT	1uF	20%	50V
C1011	1-124-667-11	ELECT	10uF	20%	100V
C1012	1-124-667-11	ELECT	10uF	20%	100V
C1013	1-124-465-00	ELECT	4.7uF	20%	50V
C1014	1-124-667-11	ELECT	10uF	20%	100V
C1015	1-126-154-11	ELECT	47uF	20%	6.3V
C1016	1-126-301-11	ELECT	1uF	20%	50V
C1017	1-124-667-11	ELECT	10uF	20%	100V
C1018	1-124-499-11	ELECT, NONPOLAR	1uF	20%	50V
C1019	1-126-154-11	ELECT	47uF	20%	6.3V
C1020	1-126-301-11	ELECT	1uF	20%	50V
C1021	1-126-154-11	ELECT	47uF	20%	6.3V
C1023	1-126-154-11	ELECT	47uF	20%	6.3V
C1024	1-126-301-11	ELECT	1uF	20%	50V
C1025	1-126-301-11	ELECT	1uF	20%	50V
C1026	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1027	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1028	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1029	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1030	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1031	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1033	1-162-289-31	CERAMIC	390PF	10%	50V
C1034	1-161-494-00	CERAMIC	0.022uF		25V
C1035	1-162-195-31	CERAMIC	4.7PF	10%	50V
C1036	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1037	1-162-285-31	CERAMIC	180PF	10%	50V
C1039	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1040	1-162-209-31	CERAMIC	27PF	5%	50V
C1041	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1042	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1043	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1044	1-161-057-00	CERAMIC	0.033uF	10%	50V
C1045	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1046	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1047	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1048	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1049	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1050	1-164-079-11	CERAMIC	330PF	5%	50V
C1051	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1052	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1053	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1054	1-164-073-11	CERAMIC	100PF	10%	50V
C1055	1-162-219-31	CERAMIC	68PF	5%	50V
C1056	1-162-207-11	CERAMIC	22PF	5%	50V
C1058	1-161-063-00	CERAMIC	0.1uF	10%	50V
C1059	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1076	1-162-292-11	CERAMIC	680PF	10%	50V
C1078	1-162-203-11	CERAMIC	15PF	5%	50V
C1079	1-162-207-31	CERAMIC	22PF	5%	50V (X211ME/PS/SA)
C1082	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1084	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1085	1-162-211-11	CERAMIC	33PF	5%	50V
C1086	1-162-210-11	CERAMIC	30PF	5%	50V
C1087	1-101-880-11	CERAMIC	47PF	5%	50V

CP-A

Ref.No.	Part No.	Description			Remark
C1089	1-101-880-11	CERAMIC	47PF	5%	50V
C1099	1-161-494-00	CERAMIC	0.022uF		25V
C1101	1-126-529-11	ELECT	0.47uF	20%	50V
C1102	1-124-667-11	ELECT	10uF	20%	100V
C1103	1-161-021-11	CERAMIC	0.047uF	10%	25V
C1201	1-124-472-11	ELECT	470uF	20%	10V
C1202	1-161-063-00	CERAMIC	0.1uF	10%	50V
C2002	1-162-293-31	CERAMIC	820PF	10%	50V
C2004	1-124-229-00	ELECT	33uF	20%	10V
C2005	1-161-054-00	CERAMIC	0.018uF	10%	25V
C2009	1-124-638-11	ELECT	22uF	20%	10V
C2010	1-124-589-11	ELECT	47uF	20%	16V
C2013	1-161-053-00	CERAMIC	0.015uF	10%	50V
C2016	1-126-163-11	ELECT	4.7uF	20%	50V
C2017	1-124-667-11	ELECT	10uF	20%	100V
C2019	1-124-589-11	ELECT	47uF	20%	16V
C2020	1-162-286-31	CERAMIC	220PF	10%	50V
C2021	1-110-363-11	CAP, POLYP	6800PF		100V
C2022	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2024	1-161-379-00	CERAMIC	0.01uF	20%	25V
C2051	1-162-283-31	CERAMIC	120PF	10%	50V
C2091	1-161-063-00	CERAMIC	0.1uF	10%	50V
C2092	1-161-375-00	CERAMIC	0.0022uF	20%	50V
C2099	1-161-056-00	CERAMIC	0.027uF	10%	25V
C2101	1-161-063-00	CERAMIC	0.1uF	10%	50V
C2102	1-161-063-00	CERAMIC	0.1uF	10%	50V
C2152	1-161-039-00	CERAMIC	0.001uF	10%	50V
C2153	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3001	1-162-199-31	CERAMIC	10PF	5%	50V
C3002	1-102-958-00	CERAMIC	20PF	5%	50V
C3003	1-161-772-11	CERAMIC	0.1uF	10%	25V
C3004	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3005	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3008	1-124-638-11	ELECT	22uF	20%	10V
C3009	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3010	1-107-501-11	DL-ELECT (0.1F 5.5V)			
C3011	1-124-257-00	ELECT	2.2uF	20%	50V
C3012	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3016	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3020	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3021	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3022	1-126-168-11	ELECT	1000uF	20%	6.3V
C3023	1-162-201-31	CERAMIC	12PF	5%	50V
C3025	1-162-290-31	CERAMIC	470PF	10%	50V
C3026	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3501	1-161-053-00	CERAMIC	0.015uF	10%	50V
C3502	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3503	1-161-053-00	CERAMIC	0.015uF	10%	50V
C3505	1-124-234-00	ELECT	22uF	20%	16V

Ref.No.	Part No.	Description			Remark
C3506	1-161-329-00	CERAMIC	0.0068uF	30%	25V
C3508	1-124-234-00	ELECT	22uF	20%	16V
C3511	1-162-286-31	CERAMIC	220PF	10%	50V
C3513	1-161-061-11	CERAMIC	0.068uF	10%	50V
C3514	1-136-167-00	FILM	0.15uF	5%	50V
C3515	1-130-487-00	MYLAR	0.022uF	5%	50V
C3516	1-161-375-00	CERAMIC	0.0022uF	20%	50V
C3517	1-161-374-11	CERAMIC	0.0015uF	20%	50V
C3522	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3523	1-126-301-11	ELECT	1uF	20%	50V
C3524	1-161-379-00	CERAMIC	0.01uF	20%	25V
C3525	1-124-465-00	ELECT	0.47uF	20%	50V
C3526	1-161-494-00	CERAMIC	0.022uF		25V
C3530	1-126-154-11	ELECT	47uF	20%	6.3V
C3536	1-126-155-11	ELECT	100uF	20%	6.3V
C3540	1-164-073-11	CERAMIC	100PF	10%	50V
C3551	1-136-166-00	FILM	0.12uF	5%	50V
C3552	1-164-064-11	CERAMIC	56PF	5%	50V
C3553	1-126-301-11	ELECT	1uF	20%	50V
C3554	1-162-284-31	CERAMIC	150PF	10%	50V
C3556	1-161-039-00	CERAMIC	0.001uF	10%	50V
C3558	1-124-229-00	ELECT	33uF	20%	10V
C3561	1-130-488-11	MYLAR	0.027uF	5%	50V (X211ME/PS/SA)
C3561	1-130-490-11	MYLAR	0.039uF	5%	50V (236EE)
C3562	1-130-480-00	MYLAR	0.0056uF	5%	50V (X211ME/PS/SA)
C3570	1-161-063-00	CERAMIC	0.1uF	10%	50V
C3571	1-126-155-11	ELECT	100uF	20%	6.3V
⚠C5001	1-130-679-11	FILM	0.068uF	20%	300V
⚠C5002	1-130-679-11	FILM	0.068uF	20%	300V
⚠C5003	1-161-740-00	CERAMIC	470PF	10%	400V
⚠C5004	1-161-741-12	CERAMIC	0.001uF	20%	400V
C5005	1-161-740-12	CERAMIC	470PF	10%	400V
C5010	1-128-529-11	CAP, ELECT	82uF		400V (X211ME/PS/SA)
C5010	1-125-554-11	ELECT	47uF	20%	400V (236EE)
C5011	1-123-944-00	ELECT	2.2uF	20%	250V
C5012	1-104-596-11	CAP, CERAMIC	39PF		
C5013	1-126-096-11	ELECT	10uF	20%	35V
C5101	1-126-105-11	ELECT	1000uF	20%	35V
C5102	1-126-103-11	ELECT	470uF	20%	16V
C5104	1-126-926-11	ELECT	1000uF	20%	10V
C5105	1-124-472-11	ELECT	470uF	20%	10V
C5106	1-124-910-11	ELECT	47uF	20%	50V
C5107	1-124-910-11	ELECT	47uF	20%	50V
C5108	1-126-176-11	ELECT	220uF	20%	10V

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

CP-A

Ref.No.	Part No.	Description				Remark
C5110	1-130-491-00	MYLAR	0.047uF	5%	50V	
C5111	1-161-063-00	CERAMIC	0.1uF	10%	50V	
C5112	1-124-455-00	ELECT	100uF	20%	16V	
C5113	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C5114	1-126-154-11	ELECT	47uF	20%	6.3V	
C5116	1-165-171-11	CERAMIC	220PF		500V	
C5117	1-126-096-11	ELECT	10uF	20%	35V	
C5118	1-126-096-11	ELECT	10uF	20%	35V	
C6001	1-124-259-11	ELECT	4.7uF	20%	50V	
C6003	1-124-767-00	ELECT	2.2uF	20%	50V	
C6004	1-136-165-00	FILM	0.1uF	5%	50V	
C6005	1-161-063-00	CERAMIC	0.1uF	10%	50V	
C6008	1-161-057-00	CERAMIC	0.033uF	10%	50V	
C6009	1-124-455-00	ELECT	100uF	20%	16V	
C6010	1-249-910-11	ELECT	47uF	20%	50V	
C6011	1-161-379-00	CERAMIC	0.01uF	20%	25V	
C6012	1-161-021-11	CERAMIC	0.047uF	10%	25V	
C6014	1-161-375-00	CERAMIC	0.0022uF	20%	50V	
C6015	1-161-375-00	CERAMIC	0.0022uF	20%	50V	
C6602	1-124-472-11	ELECT	470uF	20%	10V	
C6901	1-124-455-00	ELECT	100uF	20%	16V	
C6902	1-161-063-00	CERAMIC	0.1uF	10%	50V	
C6903	1-124-667-11	ELECT	10uF	20%	100V	
C6904	1-161-494-00	CERAMIC	0.022uF		25V	
C6905	1-124-464-11	ELECT	0.22uF	20%	50V	
C6906	1-161-063-00	CERAMIC	0.1uF	10%	50V	
C6921	1-126-233-11	ELECT	22uF	20%	50V	
C6922	1-162-285-31	CERAMIC	180PF	10%	50V	
C6923	1-136-171-00	FILM	0.33uF	5%	50V	
C6924	1-136-169-00	FILM	0.22uF	5%	50V	

< DIODE >

D1007	8-719-912-20	DIODE	1SS120
D1008	8-719-912-20	DIODE	1SS120(X211ME/PS/SA)
D1071	8-719-912-20	DIODE	1SS120
D1072	8-719-912-20	DIODE	1SS120
D1096	8-719-912-20	DIODE	1SS120
D1101	8-719-912-20	DIODE	1SS120
D1102	8-719-912-20	DIODE	1SS120
D1201	8-719-912-20	DIODE	1SS120
D1202	8-719-912-20	DIODE	1SS120
D3001	8-719-986-73	DIODE	RB441Q
D3108	8-719-901-33	DIODE	1SS133T-77(X211SA)
D3114	8-719-901-33	DIODE	1SS133T-77(X211ME/PS/SA)
D3115	8-719-901-33	DIODE	1SS133T-77
D3117	8-719-901-33	DIODE	1SS133T-77(X211ME/PS/SA)
D3502	8-719-912-20	DIODE	1SS120
D3554	8-719-912-20	DIODE	1SS120(X211ME/PS/SA)
D5001	1-809-768-11	DIODE	DBC10G

Ref.No.	Part No.	Description	Remark
D5003	1-808-898-11	DIODE APOIC-V0	
D5004	8-719-901-83	DIODE 1SS83	
⚠D5011	1-809-752-11	DIODE PHOTO COUPLER PC120FB	
D5101	1-809-095-11	TRANSISTOR RL2Z-LF-B1	
D5102	1-810-240-11	DIODE DI ERC30-02L38	
D5103	1-808-899-11	DIODE AG01-V2	
D5104	8-719-901-83	DIODE 1SS83	
D5105	1-808-899-11	DIODE AG01-V2	
D5109	8-719-010-34	DIODE uZ-4.7BSC	
D5110	1-809-070-11	DIODE AK04-V2	
D5111	8-719-912-20	DIODE 1SS120	
D5112	8-719-921-44	DIODE MTZJ-5.1C	
D5113	8-719-300-45	DIODE EM-1Z	
D5114	8-719-901-83	DIODE 1SS83	
D6901	8-719-901-33	DIODE 1SS133T-77	
D6902	8-719-901-33	DIODE 1SS133T-77	
D6903	8-719-901-33	DIODE 1SS133T-77	

< FUSE >

⚠F5001	1-532-297-00	QUICK-ACTING FUSE(T2.5A/250V)	

< IC >

IC101	1-810-626-11	IC	LA7435M-MPB
IC102	1-810-627-11	IC	LC89970M
IC104	1-810-636-11	IC	LA7356ML-TRM
IC111	8-759-820-48	IC	LA7221
IC201	1-810-497-11	IC	LA7285M-TRM
IC301	1-810-625-11	IC	LC866632V-5520
IC302	1-810-367-11	IC	LB1643
IC303	1-809-383-11	IC	MN1380-L
IC351	1-810-496-11	IC	BU2896K
IC501	1-810-319-11	IC	STR-M6549
IC511	1-810-060-11	IC	L5431-AA
IC512	1-810-228-11	IC	PQ12SZ11
IC602	8-759-248-79	IC	AT24C01A-10PC
IC691	8-759-800-65	IC	LA7910
IC692	1-809-787-11	IC	L5631

< COIL >

L1001	1-412-818-11	INDUCTOR	150uH
L1021	1-410-511-11	INDUCTOR	15uH
L1022	1-500-129-11	CORE, BEAD	
L1079	1-410-521-11	INDUCTOR	100uH
L1086	1-410-509-11	INDUCTOR	10uH
L1087	1-410-518-41	INDUCTOR	56uH
L1088	1-410-511-11	INDUCTOR	15uH
L1089	1-410-514-11	INDUCTOR	2.7uH
L2002	1-412-822-11	HF CHOKE	10000uHJ
L2003	1-410-491-11	INDUCTOR	560uH

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Replace only with part number specified.

CP-A

Ref. No.	Part No.	Description	Remark
L2051	1-500-128-11	CORE, FERRITE	
L3001	1-410-316-11	INDUCTOR 1uH	
L3002	1-500-129-11	CORE, BEAD	
L3003	1-500-129-11	CORE, BEAD	
⚠L5002	1-409-611-11	COIL, LINE FILTER	
L5003	1-543-699-11	CORE(X211ME/PS/SA)	
* L5003	1-500-055-11	CORE, FERRITE(236EE)	
L5101	1-410-509-11	INDUCTOR 10uH	
L5102	1-408-413-00	INDUCTOR 22uH	
L6001	1-410-509-11	INDUCTOR 10uH	
L6002	1-410-509-11	INDUCTOR 10uH	
L6003	1-410-509-11	INDUCTOR 10uH	
L6004	1-410-509-11	INDUCTOR 10uH	
L6005	1-410-509-11	INDUCTOR 10uH	
L6006	1-410-325-11	INDUCTOR 5, 6uH	
L6007	1-410-325-11	INDUCTOR 5, 6uH	
		< PROTECTOR, CIRCUIT >	
PR511	1-533-430-11	PROTECTOR, CIRCUIT	
		< TRANSISTOR >	
Q1004	8-729-900-89	TRANSISTOR DTC144ES	
Q1005	8-729-900-89	TRANSISTOR DTC144ES	
Q1006	8-729-900-89	TRANSISTOR DTC144ES	
Q1009	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1010	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1013	8-729-902-11	TRANSISTOR 2SC2021	
Q1071	8-729-902-11	TRANSISTOR 2SC2021	
Q1073	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q1074	8-729-900-89	TRANSISTOR DTC144ES	
Q1075	8-729-900-89	TRANSISTOR DTC144ES	
Q1078	8-729-900-89	TRANSISTOR DTC144ES	
Q1079	8-729-900-89	TRANSISTOR DTC144ES(X211ME/PS/SA)	
Q1087	8-729-266-83	TRANSISTOR 2SC2668	
Q1088	8-729-266-83	TRANSISTOR 2SC2668	
Q1089	8-729-902-11	TRANSISTOR 2SC2021	
Q1201	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q1225	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q2001	1-810-471-11	TRANSISTOR 2SC3331-S-AA	
Q2002	8-729-900-89	TRANSISTOR DTC144ES	
Q2003	8-729-900-63	TRANSISTOR DTA124ES	
Q3001	8-729-900-89	TRANSISTOR DTC144ES	
Q3002	8-729-900-89	TRANSISTOR DTC144ES(X211ME/PS/SA)	
Q3504	8-729-900-89	TRANSISTOR DTC144ES	
Q3551	8-729-902-11	TRANSISTOR 2SC2021(X211ME/PS/SA)	
Q3552	8-729-902-11	TRANSISTOR 2SC2021(X211ME/PS/SA)	
Q3554	8-729-900-89	TRANSISTOR DTC144ES(X211ME/PS/SA)	
Q3555	8-729-900-89	TRANSISTOR DTC144ES(X211ME/PS/SA)	

Ref. No.	Part No.	Description	Remark
Q5101	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q5102	8-729-205-97	TRANSISTOR 2SC3668-Y	
Q5103	8-729-900-80	TRANSISTOR DTC114ES	
Q6001	1-810-273-11	TRANSISTOR 2SK772-E-AC	
Q6002	8-729-900-89	TRANSISTOR DTC144ES	
Q6003	8-729-900-89	TRANSISTOR DTC144ES(X211SA)	
Q6901	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6902	8-729-119-76	TRANSISTOR 2SA1175-HFE	
Q6903	8-729-119-78	TRANSISTOR 2SC2785-HFE	
Q6904	8-729-900-89	TRANSISTOR DTC144ES	
Q6921	8-729-345-85	TRANSISTOR 2SC458K	
		< RESISTOR >	
R2009	1-202-720-11	SOLID 1.2M 5% 1/2W	
R3001	1-212-946-00	FUSIBLE 3.3 5% 1/2W F	
⚠R5001	1-202-724-00	SOLID 2.7M 10% 1/2W	
R5003	1-215-903-11	METAL OXIDE 68K 5% 2W F	
R5005	1-211-886-11	OXIDE-MT 470K 1W (X211ME/PS/SA)	
R5005	1-260-133-11	CARBON 680K 5% 1/2W (236EE)	
R5006	1-211-886-11	OXIDE-MT 470K 1W (X211ME/PA/SA)	
R5006	1-260-133-11	CARBON 680K 5% 1/2W (236EE)	
R5010	1-216-344-00	METAL OXIDE 0.39 5% 1W F (X211ME/PS/SA)	
R5010	1-216-345-11	METAL 0.47 5% 1W F (236EE)	
R5105	1-214-723-00	METAL 560 1% 1/4W	
R5106	1-214-127-00	METAL 620 1% 1/4W	
R5115	1-214-106-00	METAL 82 1% 1/4W	
R5120	1-217-382-00	FUSIBLE 3.9 5% 1/4W	
		< SWITCH >	
S6001	1-692-957-11	SWITCH, SLIDE(1P-2T)(TV SYSTEM) (236EE/X211ME/PS)	
S6001	1-762-057-11	SWITCH, SLIDE(2P-3T)(TV SYSTEM)(X211SA)	
		< TRANSFORMER >	
T2001	1-433-370-11	TRANSFORMER, OSC	
⚠T5001	1-426-753-11	TRANSFORMER, POWER PULSE	
T6901	1-426-511-11	TRANSFORMER, IF	
		< VARIABLE RESISTOR >	
VR201	1-228-997-00	RES, ADJ, METAL 100K(BIAS)	
VR351	1-228-998-00	RES, ADJ, METAL 220K(SW-P)	
		< CRYSTAL >	
X1001	1-577-667-11	CRYSTAL, OSC (4.43MHz)	
X3001	1-760-310-11	CERAMIC, OSC (13.3MHz)	
X3002	1-579-220-11	CRYSTAL, OSC (32KHz)	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

MC-1 **MC-4** **TM-1** **TM-2** **VP-1**

Ref.No.	Part No.	Description	Remark
	A-6756-237-A	MC-1 BOARD, COMPLETE	
		**********	
	1-571-932-11	SWITCH, LEAF	
	1-808-723-11	PHOTO COUPLER SPI-315-04-C	
**********			
*	A-6756-374-A	MC-4 BOARD, COMPLETE	
		**********	
	1-808-722-11	DIODE LN59	
**********			
*	A-6754-714-A	TM-1 BOARD, COMPLETE(236EE)	
*	A-6754-717-A	TM-1 BOARD, COMPLETE(X211ME/PS/SA)	
		**********	
*	3-947-425-01	HOLDER, LED	
*	3-955-105-01	HOLDER, LED	
*	3-958-684-01	HOLDER, FL	
		< INDICATOR TUBE >	
A7001	1-517-310-11	INDICATOR TUBE, FLUORESCENT	
		< DIODE >	
D7001	8-719-301-44	LED SEL2410E-D(NTSC PB)(X211ME/PS/SA)	
D7002	8-719-301-44	LED SEL2410E-D(ON/STANDBY)	
D7003	8-719-301-44	LED SEL2410E-D(ON/STANDBY)	
D7011	8-719-912-20	DIODE 1SS120(X211ME/PS/SA))	
D7012	8-719-912-20	DIODE 1SS120	
D7013	8-719-912-20	DIODE 1SS120	
D7014	8-719-912-20	DIODE 1SS120	
D7015	8-719-912-20	DIODE 1SS120	
		< RECEIVER PACK >	
RR701	1-467-278-11	PACK UNIT, IR RECEIVER	
		< SWITCH >	
S7001	1-692-216-11	SWITCH, PUSH(CL)	
S7011	1-692-958-11	SWITCH, SLIDE(1P-2T (NTSC))(NTSC PB) (X211ME/PS/SA)	
S7012	1-692-216-11	SWITCH, PUSH(●REC/QRT)	
S7013	1-692-392-11	SWITCH, PUSH(⏏EJECT)	
S7014	1-692-392-11	SWITCH, PUSH(ON/STANDBY)	
S7015	1-692-216-11	SWITCH, PUSH(PROGRAM+)	
S7016	1-692-216-11	SWITCH, PUSH(PROGRAM-)	
S7017	1-692-216-11	SWITCH, PUSH(TUNER PRESET)	
S7018	1-692-216-11	SWITCH, PUSH(NEXT)	
S7019	1-692-216-11	SWITCH, PUSH (▲TRACKING/STILL ADJUST/FINE TUNING)	
S7020	1-692-216-11	SWITCH, PUSH (▼TRACKING/STILL ADJUST/FINE TUNING)	
S7021	1-692-216-11	SWITCH, PUSH(AUTO TRACKING)	
**********			
*	A-6754-718-A	TM-2 BOARD, COMPLETE	
		**********	
*	3-955-105-01	HOLDER, LED	
		< DIODE >	
D7201	8-719-301-58	LED SEL2910D-D(OPC)	
D7202	8-719-912-20	DIODE 1SS120	
D7203	8-719-912-20	DIODE 1SS120	
		< SWITCH >	
S7201	1-692-392-11	SWITCH, PUSH(▶▶REW)	
S7202	1-692-392-11	SWITCH, PUSH(◀◀FF)	
S7203	1-692-392-11	SWITCH, PUSH(▷PLAY)	
S7204	1-692-392-11	SWITCH, PUSH(■STOP)	
S7206	1-692-392-11	SWITCH, PUSH(❚❚PAUSE)	
**********			
*	A-6754-716-A	VP-1 BOARD, COMPLETE(236EE/X211ME)	
*	A-6754-838-A	VP-1 BOARD, COMPLETE(X211PS/SA)	
		**********	
		< CAPACITOR >	

C1801	1-162-207-11	CERAMIC	22PF	5%	50V
C1802	1-164-060-11	CERAMIC	39PF	10%	50V
C1803	1-101-880-11	CERAMIC	47PF	5%	50V
C1804	1-162-285-11	CERAMIC	180PF	10%	50V
C1807	1-124-465-11	ELECT	0.47uF	20%	50V
C1808	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1809	1-127-487-00	ELECT(SOLID)	4.7uF	20%	10V
C1814	1-161-057-00	CERAMIC	0.033uF	10%	50V
C1815	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1816	1-161-057-00	CERAMIC	0.033uF	10%	50V
C1817	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1819	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1820	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1822	1-164-073-11	CERAMIC	100PF	10%	50V
C1824	1-161-379-00	CERAMIC	0.01uF	20%	25V
C1825	1-161-057-00	CERAMIC	0.033uF	10%	50V
C1826	1-162-199-31	CERAMIC	10PF	5%	50V

< IC >

IC181	1-810-624-11	IC LA7410

VP-1

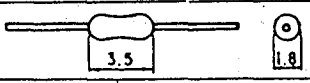
Ref. No.	Part No.	Description	Remark
		< COIL >	
L1801	1-410-513-11	INDUCTOR 22uH	
L1802	1-410-525-11	INDUCTOR 220uH	
L1803	1-410-521-11	INDUCTOR 100uH	
		**********	
		MISCELLANEOUS	
		**********	
3	1-765-272-11	CABLE, FLEXIBLE FLAT 11P	
7	1-765-583-11	CABLE, FLEXIBLE FLAT 34P	
11	1-693-248-11	TUNER (RF/TU/IF) (236EE/X211ME/PS)	
11	1-693-261-11	TUNER (RF/TU/IF) (X211SA)	
105	1-808-710-11	PHOTO TRANSISTOR	
239	1-572-383-11	SWITCH, ROTARY	
256	1-765-273-11	CABLE, FLEXIBLE FLAT 22P	
* 289	1-461-017-11	ROTOR	
299	1-462-284-11	STATOR	
301	1-698-156-11	MOTOR, CAPSTAN (DC 3W)	
		**********	
		ACCESSORIES & PACKING MATERIALS	
		**********	
	1-467-749-11	REMOTE COMMANDER (RMT-V155E) (236EE)	
	1-467-749-21	REMOTE COMMANDER (RMT-V155H) (X211ME/PS/SA)	
⚠	1-569-008-11	ADAPTER, CONVERSION 2P (X211ME/SA)	
⚠	1-590-224-11	CORD, POWER	
	3-708-885-01	COVER, BATTERY	
	3-749-104-01	CABLE, ANT	
	3-758-446-41	MANUAL, INSTRUCTION (ENGLISH) (X211ME)	
	3-758-451-11	MANUAL, INSTRUCTION, MN10EE (ENGLISH/RUSSIAN/CZECH/POLISH) (236EE)	
	3-759-106-51	MANUAL, INSTRUCTION (ENGLISH) (X211SA)	
	3-759-107-51	MANUAL, INSTRUCTION (ENGLISH/CHINESE) (X211PS)	
*	3-958-692-01	INDIVIDUAL CARTON (X211ME)	
*	3-958-693-01	CUSHION (FRONT)	
*	3-958-694-01	CUSHION (BACK)	
*	3-958-802-01	INDIVIDUAL CARTON (236EE)	
	3-959-913-01	INDIVIDUAL CARTON (X211PS)	
	3-959-916-01	INDIVIDUAL CARTON (X211SA)	

Ref. No.	Part No.	Description	Remark
		**********	
		HARDWARE LIST	
		**********	
#1	7-685-647-79	SCREW +BVTP 3X10 TYPE2 SLIT	
#2	7-682-547-09	SCREW +B 3X6	
#3	7-685-534-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#4	7-685-661-19	SCREW +BVTP 4X12 TYPE2 N-S	
#5	7-685-131-19	SCREW +BTP 2.6X4 TYPE2 N-S	
#6	7-624-105-04	STOP RING 2.3, TYPE -E	
#7	7-682-648-09	SCREW (3X8), +PW	
#8	7-621-732-08	SET-SCT, HEX. 2X3 FLAT POINT	
#9	7-685-547-19	SCREW +BTP 3X10 TYPE2 N-S	
#10	7-685-133-19	SCREW, TOTSU PTP 2.6X6 TYPE2	
#11	7-682-903-01	SCREW (3X4), +PWH	
#12	7-621-759-45	+PSW, 2.6X6	
#13	7-688-001-03	W 2, SMALL	
#14	7-685-134-19	SCREW, TOTSU PTP 2.6X8 TYPE2	
#15	7-628-253-20	SCREW (2.3X6), +PSW	

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Description

CARBON RESISTOR 5% ¼W 5% ¼W A



Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.	Value	Part. No.
0.22Ω		11Ω	1-247-784-00	200Ω	1-247-814-11	3.6kΩ	1-247-844-11	62kΩ	1-247-874-11	1.2MΩ	1-259-877-11
0.27Ω		12Ω	1-249-394-11	220Ω	1-249-409-11	3.9kΩ	1-249-424-11	68kΩ	1-249-439-11	1.5MΩ	1-259-878-11
0.33Ω		13Ω	1-247-786-11	240Ω	1-247-816-11	4.3kΩ	1-247-846-11	75kΩ	1-247-876-11	1.8MΩ	1-259-879-11
0.39Ω		15Ω	1-249-395-11	270Ω	1-249-410-11	4.7kΩ	1-249-425-11	82kΩ	1-249-440-11	2.0MΩ	
0.47Ω	1-249-377-11	16Ω	1-247-788-00	300Ω	1-247-818-11	5.1kΩ	1-247-848-11	91kΩ	1-247-878-00	2.2MΩ	1-259-880-11
0.56Ω	1-249-378-11	18Ω	1-249-396-11	330Ω	1-249-411-11	5.6kΩ	1-249-426-11	100kΩ	1-249-441-11	2.7MΩ	1-259-881-11
0.68Ω	1-249-379-11	20Ω	1-247-790-11	360Ω	1-247-820-11	6.2kΩ	1-247-850-11	110kΩ	1-247-880-11	3.3MΩ	1-259-882-11
0.82Ω	1-249-380-11	22Ω	1-249-397-11	390Ω	1-249-412-11	6.8kΩ	1-249-427-11	120kΩ	1-247-881-00	3.9MΩ	1-259-883-11
1.0Ω	1-249-381-11	24Ω	1-247-792-11	430Ω	1-247-822-11	7.5kΩ	1-247-852-11	130kΩ	1-247-882-11	4.7MΩ	1-259-884-11
1.2Ω	1-249-382-11	27Ω	1-249-398-11	470Ω	1-249-413-11	8.2kΩ	1-249-428-11	150kΩ	1-247-883-00	5.6MΩ	
1.5Ω	1-249-383-11	30Ω	1-247-794-11	510Ω	1-249-442-11	9.1kΩ	1-247-854-11	160Ω	1-247-884-11	6.8MΩ	
1.6Ω		33Ω	1-249-399-11	560Ω	1-249-414-11	10kΩ	1-249-429-11	180Ω	1-247-885-00	8.2MΩ	
1.8Ω	1-249-384-11	36Ω	1-247-796-11	620Ω	1-247-826-00	11kΩ	1-247-856-00	200kΩ	1-247-886-11	10MΩ	
2.2Ω	1-249-385-11	39Ω	1-249-400-11	680Ω	1-249-415-11	12kΩ	1-249-430-11	220kΩ	1-247-887-00	12MΩ	
2.4Ω	1-247-768-00	43Ω	1-247-798-11	750Ω	1-247-828-11	13kΩ	1-247-858-11	240kΩ	1-247-888-11	15MΩ	
2.7Ω	1-249-386-11	47Ω	1-249-401-11	820Ω	1-249-416-11	15kΩ	1-249-431-11	270kΩ	1-247-889-00	18MΩ	
3.0Ω	1-247-770-00	51Ω	1-247-800-11	910Ω	1-247-830-11	16kΩ	1-247-860-11	300kΩ	1-247-890-11	22MΩ	
3.3Ω	1-249-387-11	56Ω	1-249-402-11	1.0kΩ	1-249-417-11	18kΩ	1-249-432-11	330kΩ	1-247-891-00		
3.6Ω	1-247-772-00	62Ω	1-247-802-11	1.1kΩ	1-247-832-11	20kΩ	1-247-862-11	360kΩ	1-247-892-11		
3.9Ω	1-249-388-11	68Ω	1-249-403-11	1.2kΩ	1-249-418-11	22kΩ	1-249-433-11	390kΩ	1-247-893-11		
4.3Ω	1-247-774-00	75Ω	1-247-804-11	1.3kΩ	1-247-834-11	24kΩ	1-247-864-11	430kΩ	1-247-894-11		
4.7Ω	1-249-389-11	82Ω	1-249-404-00	1.5kΩ	1-249-419-11	27kΩ	1-249-434-11	470kΩ	1-247-895-00		
5.1Ω	1-247-776-00	91Ω	1-247-806-11	1.6kΩ	1-247-836-11	30kΩ	1-247-866-11	510kΩ	1-247-896-11		
5.6Ω	1-249-390-11	100Ω	1-249-405-11	1.8kΩ	1-249-420-11	33kΩ	1-249-435-11	560kΩ	1-247-897-11		
6.2Ω	1-247-778-00	110Ω	1-247-808-11	2.0kΩ	1-247-838-00	36kΩ	1-247-868-11	620kΩ	1-247-898-11		
6.8Ω	1-249-391-11	120Ω	1-249-406-11	2.2kΩ	1-249-421-11	39kΩ	1-249-436-11	680kΩ	1-247-899-11		
7.5Ω	1-247-780-00	130Ω	1-247-810-11	2.4kΩ	1-247-840-00	43kΩ	1-247-870-11	750kΩ	1-247-900-11		
8.2Ω	1-249-392-11	150Ω	1-249-407-11	2.7kΩ	1-249-422-11	47kΩ	1-249-437-11	820kΩ	1-247-901-11		
9.1Ω	1-247-782-00	160Ω	1-247-812-11	3.0kΩ	1-247-842-11	51kΩ	1-247-872-11	910kΩ	1-247-902-11		
10Ω	1-249-393-11	180Ω	1-249-408-11	3.3kΩ	1-249-423-11	56kΩ	1-249-438-11	1.0MΩ	1-247-903-00		

English
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